UNDERSTANDING HOW WOMEN SEEK HEALTH INFORMATION ON THE WEB

by

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ABSTRACT

The purpose of this dissertation is to examine how women seek health information on the Web in relation to information source characteristics, situational characteristics, and socio-demographic characteristics. The Web is conceptualized as three facets that reflect the three main modes of seeking health information on the Web: websites; Web-based bulletin boards and chatrooms; and Web-based listservs and newsgroups. The lack of analytical research on this gendered online activity prompted this study.

The conceptual framework is based primarily on theoretical foundations from two academic disciplines: information science and health sciences. The independent variables in the conceptual framework are health information need, family caregiving, perceived Web self efficacy, perceptions of the quality and accessibility of the Web as a source of health information, and socio-demographic variables. The dependent variable is intensity (frequency) of seeking health information on the Web (FSHIW).

Data was collected from 264 women from November 2000 until April 2001 using a Web survey questionnaire. The participants were predominantly well educated, English-speaking Canadians. A subset of 27 survey respondents completed at least one additional component of this multi-method study. Perception of the reliability of the Web as a source of health information was identified as the key variable influencing frequency of seeking health information on the Web (FSHIW). As well, perceived information source
reliability was correlated with two information source characteristics, perceived information source relevance and cognitive access. Two situational variables, health information need and family caregiving, were weakly correlated with FSHIW. Three socio-demographic variables – racial identity, household income, and occupation – affected FSHIW. Qualitative interview data, Web use journals, and recordings of Web use sessions provided a contextualized understanding of the survey data. In particular, they highlighted the importance of situational and affective relevance.

To-date, very few empirical research studies have been conducted on how women seek health information on the Web. This unique multi-method study contributes to a better understanding of women’s use of the Web as a source of health information for resolving personal health problems and caring for family members by identifying key variables that affect the frequency of this online behaviour and contextualizing these variables.
I owe a considerable debt to all of the individuals who have helped and supported me during this lengthy journey. First of all, I would like to express my deepest appreciation to my thesis supervisor, Professor Chun Wei Choo. His insights on theories of information seeking behaviour and the conceptual modeling of this behavior were invaluable. Furthermore, his support and encouragement throughout my enrollment in the doctoral program at the University of Toronto, Faculty of Information, is sincerely appreciated.

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Chapter 1

INTRODUCTION

1.1 Chapter overview

The purpose of this dissertation is to examine the relative influence of several factors, information source characteristics, situational characteristics, and socio-demographic characteristics, on the intensity of health information seeking on the Web by women. This research has important implications for the organization of content on consumer health websites and the usability of these sites for the general public. Information professionals, clinicians, professional writers, and IT workers such as webmasters alike play an important role in developing and updating the content for consumer health websites. A commitment to the provision of health information that is reliable, personally relevant, and easy to read and understand is crucial. This chapter presents the research problem, identifies the research questions, and describes the significance of this research.

1.2 Background of the problem

The World Wide Web (Web) represents the graphical and hypertext-based interface to the Internet. The Internet is a global network of computers linked to each other through telecommunications channels (Krol, 1994). The Internet has become an important part of daily life in this decade as both an information source, also referred to as an information channel or information utility, and as a social medium and phenomenon. While the Internet and the World Wide Web have their roots in the Western world, the Internet is global. However, access is intermittent in under-developed countries.
In 2000, locations on the Web, referred to as websites, featured predominantly textual content with hyperlinks. Static images and icons were also present, and less frequently, if at all, sound files and interactive calculators, for example, body mass index calculators. Even more exceptional at that time was the inclusion of one or more forms of computer-mediated communication on websites.

Computer-mediated communication (CMC) can be broadly defined as online communication channels that serve a community of users who subscribe to them. Individual CMC channels offer their subscribers highly contextualized information and often social support on a specific topic or issue, e.g. multiple sclerosis, Windows XP support, politics, hobbies. Humanity’s collective experiential knowledge created largely by the contributions of ordinary citizens sharing their experiences and perspectives can be found online by reading the postings on CMC channels.

Several types of CMC predate the Web, and even the Internet. For example, bulletin boards were available in the 1970s by dialing into a bulletin board system (BBS) (Krol, 1994). Similarly, USENET newsgroups were available before the Internet using dial-up connections and represented grassroots efforts at networked computing while academic, military, and private sector endeavours were underway in this field and received official recognition. According to CANARIE’s account of the history of the development of the Internet in Canada (2001, pp. 38-39), “Canada’s official connection to the ARPAnet was made through DREnet in 1983. Unofficially, however, Canada had already been connected to the ARPAnet through the upstart international network known as Usenet, established in 1979… Usenet quickly dwarfed the ARPAnet in terms of nodes, users and traffic…. By 1983, there were over 600 nodes on Usenet serving thousands of users. Marginal though the network was, it was a powerful source of information (sometimes misinformation) and communication.”
With the advent of the Internet, protocols for handling these different types of CMC were created. Internet protocols for CMC channels include the nntp protocol for newsgroups, the listserv protocol for listservs, and the Internet relay chat protocol for chatrooms. Chatrooms provide transient and permanent channels for real time communication (Krol, 1994). CMC and their online communities comprised the original Social Web well before the advent of Web 2.0, which has become synonymous with the Social Web. By the late 1990s, CMC was being integrated into the Web as the Web evolved from a largely static online medium to an interactive medium (Bromberg, 1996; Notess, 2009; Molnár, Gáspár, Kárpáti, and Aoki, 2009).

Both Cotton and Gupta (2004) and Rice (2006) have identified the advantages of the Web as an information source, as follows: continuous access to extensive information that can be rapidly updated, anonymous use, ability to interact with others, and social and emotional support. However, many disadvantages have been noted, including, costs associated with computer technology and Internet access, problems with access for those with disabilities, changes in location and permanence of information, variable quality of information, the presence of advertisements, privacy concerns, and lack of organization of Web content (Ullrich and Vaccaro, 2002; Cotton and Gupta, 2004; Rice, 2006).

1.2.1 Canadian Internet demographics and usage trends

In 1996, an ACNielsen/Nordicity survey reported 20% of Canadians were online, with 44% of Canadian Internet users online for less than six months and self-reported at the level of ‘beginner’. At that time, Ontarians were the highest Internet users, with Quebec in second place. Even at that early stage in Internet adoption, 45% of Canadian Internet
users were female and 55% were male, a modest gender gap. The majority were between 25 and 44 years of age. The Internet Telecommunications Union (ITU), a United Nations agency, publishes comprehensive statistics on the telecommunications/ICT sector. According to the ITU database of Internet statistics (2010), Canada’s Internet penetration was 40.3% in 2000 and 84.3% in 2008. In 2002, female Internet users as a percentage of total Internet users were 51% in both Canada and the United States, the highest percentage worldwide.

Surveys of household Internet adoption were conducted annually by Statistics Canada (General Social Survey; Household Internet Use Survey) from 1993 to 2003. Analyses of these demographic surveys conducted by Statistics Canada staff as well as by Canadian academics (Dryburgh, 2001; Crowley, 2002; Middleton, 2005, 2007; Veenhof, 2006), and additionally, market research studies of Canadian Internet demographics and Internet usage trends conducted by Ipsos-Reid, ACNielsen, MediaMetrix, and others, revealed an initially rapid increase in household Internet use and later a more gradual increase in household Internet Use. In 2000, disparities in household Internet use across the country were apparent, with East Coast provinces and rural areas of Canada having lower rates of Internet adoption and use, while other demographic gaps identified in the earlier stages of Internet development in the 1990s, including gender, Francophone ethnicity, minority races, level of education, and income, diminishing. The age disparity remained significant in 2000, with many youth online, but less than 20% of seniors. In the long term, Crowley (2002) predicted that technological literacy, conceptualized as cognitive access to the Web and Web self-efficacy in this study, will become a greater issue than demographic differences.
Starting in 2005, biennial surveys of individual Canadian Internet use have been conducted by Statistics Canada. Analyses of this survey data by Middleton (Middleton and Sorenson, 2005; Middleton and Leith, 2007) revealed the ongoing existence of digital inequalities in Internet access in Canada according to income, education, and age. From Statistics Canada’s Canadian Internet Use Survey data, women have been Internet users for a shorter period of time than men and they conduct fewer activities online than men. High intensity users are predominantly young (18-24) and male. As longevity of Internet use (number of years online) increases, the number of high intensity users increases. As well, scope of use increases as users become more experienced with the Internet. The most popular online activities are e-mail and general Internet browsing. Searching for health information was identified as the sixth most popular online activity.

1.2.2 American Internet demographics and usage trends

According to a Pew Research Center report (2001), the Internet user population in the United States continued to grow steadily from 88 million to more than 104 million in the second half of 2000, with 56% of American adults online. The increased number of Internet users was attributed to the greater number of women, minorities, middle-class ($30,000-50,000), and parents with children going online. More Blacks made purchases online and more Hispanics used the Web to find financial information. However, the digital divide according to age and household income persisted, with fewer older Americans and poorer Americans online. In 2002 (Rainie and Horrigan, 2002), noted that the number of experienced internet users continued to grow in the United States. As well, the Internet became pervasive in American culture.
However, another study conducted by the Pew Institute in 2002 (Rainie, Madden, Boyce, et al., 2003) that focused on so-called Net Dropouts and Net Evaders revealed why an estimated 42% of Americans were non-users. Many non-users (74%) have family members and close friends who go online. There is some reliance on these individuals for email communication and Web searching on their behalf. Non-users are aware of Internet public access points, most frequently identifying the public library as a public access point. Some non-users (27%) only know a few people who are online. Of interest, it was found that those who are socially content, have a positive outlook towards the world, feel in control of their life, and are media savvy, utilizing many types of conventional and new media, are more likely to be online. Thus, *being online is now an important part of being integrated into society*.

The **digital divide** in the United States is characterized according to differences in age (young versus old), income (high versus low), employment status (employed versus unemployed), level of education (well educated versus high school education), population density (urban, suburban versus rural), race (white versus black), and being a parent. Those non-users who do not anticipate going online are characteristically poorer, older, retired, rural, white, and female. Reasons for not going online include lack of interest, cost of computers and Internet access, security concerns, lack of time, lack of English language skills (basic literacy), lack of computer skills (IT literacy), and concurrent fear and embarrassment concerning appearing unskilled in front of others. Non-users who anticipate going online in the future are more likely to be urban inhabitants, parents, and Black or Hispanic. The authors note that the disabled have among the lowest levels of Internet access in the United States, with the high cost of Internet-adaptive technologies presenting a significant barrier to Internet use. Comparing findings from large-scale studies of Internet users in Canada and the United States, it is apparent that in both countries Internet
usage grew steadily at the beginning of this decade. However, in the United States Internet growth leveled off over time with significantly more non-users than in Canada. In both countries the digital divide by gender and race has narrowed in this decade, however, differences in Internet usage by age, income, and population density persist.

The role of income, or more broadly, socioeconomic status, in both limiting Internet access and the types of activities undertaken online has been studied by Hargittai in two population demographics; the disabled and youth. Using nationally representative data on Americans' Internet uses obtained from the Bureau of Labor Statistics and the Census of the United States, Hargittai and Dobransky (2006) found that people with disabilities are less likely to live in households with computers, are less likely to use computers and are less likely to be online. However, when socioeconomic background is controlled for, those with hearing disabilities and those who have limited mobility are not less likely to be Internet users. In one study on young adults’ (ages 18-26) online activities, Hargittai (Hargittai and Hinnant, 2008) found that youth with a higher level of education, greater online skills, and more resources, are more likely to use the Web for what they referred to as “capital-enhancing” activities. In the second study, (Hargittai and Walejko, 2008) discovered that youth with higher socioeconomic status as measured by parental schooling are more likely to engage in Web content creation and distribution, activities that are associated with Web 2.0, also commonly referred to as the Social Web. These studies demonstrate that socioeconomic status is a strong predictor of Web use.

1.2.3 Finding health information on the Internet: trends in Canada and the United States

By the late nineties, the number of health and medical sites on the World Wide Web was conservatively estimated at 10,000 (Ferguson, 1998). A Cyber Dialogue (1999) telephone survey of 1,602 online adults and 1,101 adults not online in the United States
revealed the number of American Internet users looking for health and medical information online nearly doubled from the previous year. Also, when free access to MEDLINE, the foremost health and medical journal literature database, became available on the Web, there was a ten-fold increase in Web access to MEDINE (Lindberg and Mymphreys, 1998).

Although Spink et al. (2006) found that seeking health information on the Web comprises a small amount of Web search engine activity because Web search sessions commonly involve searching on multiple topics, Hoffman, Novak, and Venkatesh (2004) identified health information seeking as a “top in-home application”. They noted an increase between 2000 and 2003 from 46% to 76% in the gathering of online health information (p. 38). Large-scale polls conducted by the Pew Institute in the United States and published as Pew Internet & American Life Reports reveal the percentage of American Web users who go to the Internet for health or medical information has increased from 54% in 2001 to 80% in 2006 (Fox, 2005, 2006; Fox and Fallows, 2003). An analysis of the Pew data conducted by Rice (2006) concurred with this finding of an upward trend in the use of online health information. The Health Information National Trends Survey (HINTS) data also show that over 67% of the public in the United States used the Internet for health information during the previous 12 months (National Cancer Institute, 2005).

In 2000-2001, Statistics Canada survey data (Crowley, 2002) revealed that finding medical and health information was the third-most popular online activity (57%), after email (93%) and Web browsing (90%). Moreover, differences in the types of health information sought by age were evident, with seniors interested in information on diseases and drugs, while youth were more interested in health information on healthy lifestyle topics, such as diet and exercise. Similarly, the 2002 IPSOS-Reid survey on Canadian Internet usage trends revealed searching for online health information as the
foremost online activity in Canada after generic uses such as e-mail and online searching. Two-thirds of online Canadians have visited a health website, an increase from 55% in 2000. Searching for health information online was more popular than instant messaging (54%), online banking (49%), comparison shopping (45%), and e-commerce (43%). Women were more likely than men to search for health information online (76% versus 56%) and participation rates for this activity were fairly similar across age groups. In terms of types of health information, 81% visited websites that provide information on diseases, prevention, and cures, while 51% visited nutrition information websites, 35% visited prescription drug information websites, 29% visited exercise websites, and 13% visited support group websites.

According to a Pew Institute report published in 2002 (Rainie and Horrigan, 2002), many American Internet users identified the Web as their foremost information source about health care, government services, news, and shopping. Of those who have sought information from the Web on these topics, approximately 75% were able to find the information they needed. Approximately one-third of those polled stated they would find health and medical information online, however, two-thirds stated they would contact a medical professional.

Many articles were published in the popular press shortly before this study was conducted, with titles such as “Dr. Internet will see you now” (Foss, 1999), “Is there a doctor in the mouse?” (Strauss, 2000), “The Web Docs” (Gorman, 2000), which discuss the potential of the Internet in healthcare, both as a health information resource and as a communications medium. As well, the first studies of online health information sources and user behaviour were published in reputable medical journals shortly before the timeframe for this study. Articles with titles such as “Shopping around the internet today and tomorrow: towards the millennium of cybermedicine” (Eysenbach, Sa, and Diepgen, 1999);
“Health information and interaction on the internet: a survey of female urinary incontinence” (Sandvik, 1999), and “Cancer patients’ information needs and information seeking behaviour: in depth interview study” (Leydon, Boulton, Moynihan, Jones, Mossman, Boudioni, and McPherson, 2000), indicate that health information behaviour on the Internet had become a viable research area by the late 1990s.

1.3 Statement of the problem

Studies of Web user behaviour can guide the design of Web-based health information delivery systems, making them more user-friendly. It can also assist in the development of Web-based health decision-making tools. According to Allen (1996, p. 290), “user-centered approaches create more usable information systems” and “research into user needs, tasks, and resources is required before the design can begin.” (p. 291). And according to Bruce (1998), user responsiveness to information is determined by aspects of individual users, the specific information problem and situation. A survey on Internet usage in four European countries conducted by PricewaterhouseCoopers (2000a) revealed, “Enjoyable content and overall usefulness are the major factors that were cited for return visits to websites.”

A common finding in research on consumer health information services is the predominance of female users. According to Landwirth (1987), the women’s health movement is an information-based phenomenon. Women seek health information not only for themselves but also for friends and family (Marshall, 1992; Pifalo, Hollander, Henderson, DeSalvo & McGill, 1997). Johnson, Meischke, Garu and Johnson’s (1992) pre-Internet era studies on women’s cancer information seeking also reported a high level of interest in health-related information seeking in women, especially in highly educated and middle-aged women as related to their multiple social roles as caregivers. An analysis of the U.S. Health Information National Trends Surveys (HiNTS) conducted
by Rutten, Squiers, and Hesse (2006) revealed that among cancer information seekers, about 62% were women and 58% of them were aged between 35 and 64 years old. Information seeking is one of the ways in which women enact their roles as health guardians. Connell and Crawford (1988) attribute women’s high health information seeking to their role as caregiver and lay health provider. According to Hofstede (1991), caring for others is a feminine value.

The proportion of women online increased steadily during the Nineties (Wootton, 1997) as did the number of women’s health information sites on the Internet. A ZDNet NETSTATS column on women’s use of the Internet, reported “of the top 10 news and information sites of greatest interest to women, seven are directly related to health issues” (Weiner, 1999). An online article by Intel summarizes several surveys on Internet usage in the United States that show women seek health information on the Internet much more than men do, and that the predominantly female user population of the Betterhealth (iVillage) website look primarily for disease-specific information (Intel Corporation, 2000).

More recently, the Pew reports on the use of online health information have consistently reported that middle-aged women are among the most likely to use health-related Web sites (Fox, 2005, 2006; Fox & Fallows, 2003). Women are more likely than men to use the Internet to look for health and medical information and use Web sites to get support for health or personal problems (Fallows, 2005). In a study based on the Pew Institute’s datasets on Americans’ online health information seeking, Rice (2006) found gender (female) as one of the strongest and most consistent factors of using the Internet for health information.
A recently published study from the Pew Internet Project (Fox, 2009) reveals that advances in Internet technologies such as social networking tools and broadband and mobile connectivity have altered Americans’ expectations about accessing and utilizing online health information. A majority of American patients who use the Internet (59%) read doctor reviews and hospital reviews online, as well as blogs and podcasts about health and health care. As well, one in five American patients who use the Internet have created content pertaining to health care, including online comments, reviews, photos, audio, video, and tags, suggesting that e-patients are now more likely to take an active role in their personal health and health care using interactive Internet technologies. Also, 60% of American e-patients claim that they or someone they know has been helped by following online health information or medical advice, while only 3% claim that they or someone they know has been harmed by following online health information or medical advice. However, American e-patients still rely more on healthcare practitioners and family members and friends for health information than the Internet, which tied with books for third place as a frequently used source of health information.

The gendered use of online health information by Canadians has also been examined. According to a Statistics Canada publication by Underhill and McKeown on health information and the Internet, based on findings from the 2005 Canadian Internet Use survey, women are more likely than men to seek health information online. Online health information seekers in Canada tended to have a higher level of education than either other users or non-users, and were more likely to report a higher household income (2008, p.2). Overall, the Internet, in particular, the World Wide Web, has the potential to offer women access to a vast amount of health information on the Web and social support through computer-mediated-communication channels.
Because women represent society’s health guardians (Graham, 1984; Heller, 1986) and are also the fastest growing segment of Internet users, the study of women’s health information behaviour, in general, and specifically, their health information seeking on the Web has implications for society and in particular, the health care system. As more health information is disseminated to the public through the Internet, it is becoming increasingly less the exclusive domain of healthcare professionals (Coiera, 1996; Ferguson, 1997). Armed with information collected online, women can become partners with healthcare professionals in their own care and in that of their families, an important goal of the women’s health movement founded in the Sixties as part of second wave feminism (Morgan, 2002).

Despite the predominance of women as health information consumers and health guardians, there has been little formal research on women’s health information behaviour in general (King, 1995). Many questions concerning women seeking health information, both offline and online through the Web, have yet to be conclusively answered, although in recent years, several research studies have been conducted. What are women’s health information needs? How do women search for health information, in general, and in particular, on the Web? What factors cause women to look for health information? What sources of information do they prefer, and which ones do they actually use on a regular basis? How do women use health information? What barriers do women face when looking for health information?

1.4 Research Questions

Women seek health information online for their personal use and to care for others, in particular, family members. Many variables have been shown to influence information source use, irrespective of the type of information source. In this study, a small number of variables thought to represent those directly influencing frequency of Web use for the purpose of
finding health information online are considered. Key individual characteristics include personal health status and the health status of those cared for, with uncertainty pertaining to health conditions deemed to be an important driver of online health information seeking. Family caregiving encompasses many activities, including information seeking, and therefore is also considered. Socio-demographic variables such as age, race, income, education, and others, also represent individual characteristics. A second set of characteristics pertain to the Web as an information source. This set of characteristics includes perceived information source access (physical access and cognitive access) and perceived information source quality (relevance and reliability), as well as Web self-efficacy, a widely studied socio-cognitive variable which is examined with respect to Web use.

In this study, the following global research question is posed.

What are the relative influences of information source characteristics, situational factors, and demographics on intensity of seeking health information on the Web?

From this global research question, the following specific research questions are posed:

1. Is there a significant relationship between health information need and intensity of seeking health information on the Web?
2. Is there a significant relationship between family caregiving and intensity of seeking health information on the Web?
3. Is there a significant relationship between perceived ability to use the Web effectively (Web self-efficacy) and intensity of seeking health information on the Web?
4. Is there a significant relationship between perceived relevance of health information on the Web and intensity of seeking health information on the Web?
5. Is there a significant relationship between perceived reliability of health information on the Web and intensity of seeking health information on the Web?
6. Is there a significant relationship between perceived **physical access** to the Web as an information source and intensity of seeking health information on the Web?

7. Is there a significant relationship between perceived **cognitive access** to health information on the Web and intensity of seeking health information on the Web?

1.5 **Significance of the Research**

Despite the common finding from polling data of the gendered use of the Web, and more specifically, women’s greater use of the Web to find health information, rigorous empirical research examining the factors affecting women’s use of the Web for this purpose had not been undertaken at the time of this study. However, a substantial body of literature on the characteristics of traditional information sources and their influences on usage is available in the journal literature of several disciplines, including information science, communication studies, and health sciences. Additionally, a new body of research has been underway since the mid-1990s on assessing the reliability of health information on the Web. What was required was a comprehensive examination of the relative influence of already widely researched factors on women’s use of this relatively new information source, the Web, for the domain-specific purpose of finding health information. The contribution of this study is the development of a comprehensive model of women’s health information seeking on the Web that joins together information science and communication research with health sciences research, by taking into consideration both information source characteristics and ease of using the Web (self-efficacy) and factors that capture the contextual aspects of women’s lives, health status and family caregiving, as well as including commonly researched demographic variables of importance to both sets of predictors: age, income, race, occupation, education, language, marital status, and geographic location.
1.6 Chapter summary

This chapter has described the advent of the Web as a new information source and its widespread adoption in North America for many everyday uses, in particular, the gendered use of women seeking health information on the Web. Although it is known that women seek health information to attend to their personal health conditions and in their role as family caregivers, it is important to understand which factors affect their use of the Web for this purpose, specifically, which factors facilitate this behaviour and which factors act as barriers. The research questions guiding the study were presented and the significance of the study was detailed. The next chapter presents the review of the literature which covers in greater detail the factors being considered in the study.
Chapter 2

REVIEW OF THE LITERATURE

2.1 Chapter overview

This chapter of the dissertation reviews research findings from the literature in the fields of library and information science, computer science, health and medical sciences, psychology, and women’s studies published before the timeframe of this study (November 2000 - May 2001). The literature review is organized around the variables of interest in the study. An overview of selected models of information seeking behaviour is first presented, followed by review of research pertaining to the independent variables selected for study, and their relationship with the dependent variable, intensity of seeking health information on the Web.

2.2 Theories of information seeking behaviour

2.2.1 Sense-making

Sense making is “a set of assumptions, a theoretic perspective, a methodological approach, a set of research methods, and a practice” (Dervin, 1996, p. 5). The sense-making approach is phenomenological; it assumes that the individual is involved with his or her observations. These observations must be understood from the individual’s perspective. Information is a product of human observing. Human intelligence guides the making of information by directing the parameters (how and what) of observing, and the interpretation of what has been observed.

Because all information is produced through human observation, all information is subjective (Dervin, 1983, p. 2). Information is defined as the sense made by individuals at specific moments in time-space. Sense making is the communicating behavior that allows the individual to design and construct movement through time-space. Information seeking
and use are central components of sense making (1983, p.1). They are conceived as “constructing” activities, as opposed to their traditional conceptualization as “transmitting” activities. Dervin’s concept of “circling reality” describes the process of obtaining a variety of perspectives based on many observations collected over a wide base of points in space-time in order to get a better view of reality (p. 4). Individuals do not rely on a single information source nor do they gather information only once; information seeking is an ongoing process that entails the use of multiple information sources over an extended period of time.

The metaphor of sense making views humans as moving through time and space and bridging gaps. Sense making is an ongoing process because reality is always in flux. Each individual is a theorist, constantly developing ideas to assist in understanding their personal world and also their collective, historical, and social worlds (Dervin, 1983, p. 6). The sense-making metaphor is visualized as a triangle, with situation, gap/bridge and outcome as its three vertices.

Troublesome situations are situations in which a person faces a gap that prevents further movement through life (Dervin and Clark, 1987, p. 21). Gaps are defined as confusions, worries, questions and muddles. Gaps occur because reality is constantly changing. Gaps can initiate a visit to the library or other information service provider. These actions are considered detours from the usual life path. (p. 18). Outcomes are categorized as helps, hurts, facilitations, hindrances, effects, and impacts. (p.7). Identifying people’s information needs and determining whether they were met involves tracking their journey, finding out how it stopped and how to restart it (p. 26).
According to Dervin (1992, p. 70), “individual use of information and information systems is responsive to situational conditions as defined by that individual. In essence, the individual defines and attempts to bridges discontinuities or gaps. It is this focus on gap-defining and gap-bridging which is seen as offering a way of introducing order to conceptualizations of individual behavior. It is not the individual entity that is seen as ordered but rather the gap-defining and gap-bridging that is ordered.”

Many researchers in the field of information-seeking behavior have adopted Dervin’s sense-making approach. Of relevance to the discussion of women’s health information-seeking behavior is the published work of Harris and Dewdney (1994) on the information needs of battered women. They developed six principles of information seeking based on sense making. The principles are listed below (pp. 123-129).

1. The nature of an information need and the type of help needed depend on the help seeker’s situation.
2. The decision to seek help or not seek help is affected by many factors.
3. People tend to seek out information that is most accessible.
4. People tend first to seek help or information from interpersonal sources, and especially from people like themselves.
5. Information seekers expect emotional support.
6. People follow habitual patterns in seeking information.

These six principles address several dimensions of information seeking, including information source selection, the perceived accessibility of information sources, the need for emotional support, and the individual’s situation. These aspects of information seeking emphasize the context of information seeking behaviour.
2.2.2 Six-stage models of information seeking behaviour

2.2.2.1 Kuhlthau’s model

Kuhlthau (1989) developed a six-stage model of the information-seeking process that correlates user’s thoughts, feelings and search behaviours. Her model is derived primarily from Kelly’s personal construct theory (1963), which emphasizes the way individuals perceive their world. Construct building involves moving through a series of phases, which are characterized by cognitive and affective changes. Kuhlthau’s model is also indebted to Dewey’s phases of reflection (1933), Belkin’s concept of anomalous state of knowledge (Belkin, 1980; Belkin, Oddy, and Brooks, 1982), and Taylor’s four information needs (1962, 1968). While Kuhlthau developed and validated this model based on many studies of the search process of library users in public and academic libraries, it can be generalized to other information-seeking situations.

When a novel situation is experienced, the individual is anxious and confused. This state of uncertainty increases until a threshold of choice is reached. At this point the quest for meaning is either abandoned, or a hypothesis is formed which moves the process along to confirm or reject the new construct. Searching for information causes anxiety because the individual is involved in forming new constructs and altering existing ones. As the search progresses, there is a shift from uncertainty to clarity, as well as increased interest and motivation. This approach bears some similarity to Dervin’s sense-making theory (Dervin, 1981; 1983; 1986; Dervin and Clark, 1987), which sees individuals as being blocked by a troublesome situation. The troublesome situation causes a gap that the individual seeks to bridge through help seeking.

Kuhlthau’s model of the information-seeking process begins with task initiation, characterized by the realization that information is required and the experience of
uncertainty and anxiety. Similar situations of information gathering that occurred in the past are recalled, resulting in task comprehension. Uncertainty and anxiety characterize the second stage of the search process, *topic selection*. When a topic is selected, optimism is experienced. However, if a topic is not selected, anxiety increases. At this point, the individual considers possible search strategies. The third stage, *pre-focus exploration*, entails looking for information on the general topic in order to form a focus. Inconsistencies in information retrieved leads to confusion and frustration.

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Task Initiation</th>
<th>Topic Selection</th>
<th>Pre-focus Exploration</th>
<th>Focus Formulation</th>
<th>Information Collection</th>
<th>Search closure (Presentation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feelings</td>
<td>Uncertainty</td>
<td>Optimism</td>
<td>Confusion, frustration, doubt</td>
<td>Clarity</td>
<td>Sense of direction, confidence</td>
<td>Satisfaction or disappointment</td>
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<tr>
<td>(affective)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thoughts</td>
<td>Vague</td>
<td></td>
<td>Focused</td>
<td></td>
<td>Increased interest</td>
<td>Seeking pertinent information, documenting</td>
</tr>
<tr>
<td>(cognitive)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Actions</td>
<td>Seeking relevant information, exploring</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(physical)</td>
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Figure 2.1: Model of the information search process
(Source: Kuhlthau, 1993, p. 343, Figure 1; Kuhlthau, Turock, George & Belvin, 1989, p. 10, Figure 1)

The fourth stage, *focus formulation*, represents a turning point in the search process. A personal perspective on the general topic is formed. Uncertainty and anxiety decrease.

The fifth stage, *information collection*, involves gathering topic-specific information. Confidence and purpose characterize this stage. The sixth stage, *search closure (presentation)*, represents the end of the information search. Satisfaction and relief are experienced when the search is successful. Unsuccessful searches result in disappointment. Time constraints may determine when closure occurs, more so than completeness of information retrieved (Kuhlthau, Turock, George & Belvin, 1990: Kuhlthau, 1993). The affective component is Kuhlthau’s distinct contribution to information seeking theory.
Several shortcomings have been identified for this model. First, study participants did not report tasks in the same way as they are listed in the model. Instead of following a linear sequence, subjects engaged in recursive and iterative searching. As well, many of Kuhlthau's subjects did not form a focus before gathering information. Altogether, the study design was artificial because information problems (e.g. class assignments) were imposed on specific populations, e.g., students in a library setting. Instead, the information-seeking process arising from people's information needs must be studied (Kuhlthau, 1991, p. 369). Based on Kuhlthau's admission that one of the stages, collection, may occur within several other stages, Wilson (1999, p. 266) proposes that the stages can be seen as iterative steps that lead to increased problem resolution.

### 2.2.2.2 Wilson's information acquisition process

Borrowing from stage models of information acquisition in educational psychology, computer studies, and organizational decision-making, Wilson (1997, p. 564) constructed a six-stage model of the information seeking process. The six stages are intelligence; intention, or goal formation; design; choice or selection; information extraction and integration; and review or evaluation. The stages are described in Table 2.1 below.

<table>
<thead>
<tr>
<th>Search phase</th>
<th>Description of search phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intelligence phase</td>
<td>Unprocessed data is gathered from the environment and problems are identified</td>
</tr>
<tr>
<td>Intention phase</td>
<td>A mental image of the desired goal is formed</td>
</tr>
<tr>
<td>Design phase</td>
<td>Problems are clarified, the feasibility of potential solutions is weighed, and a strategy is developed</td>
</tr>
<tr>
<td>Choice or selection phase</td>
<td>An appropriate solution is selected and acted upon</td>
</tr>
<tr>
<td>Information extraction and integration</td>
<td>Incorporates the patterns of information seeking from Ellis</td>
</tr>
<tr>
<td>Review or evaluation phase</td>
<td>An iterative, ongoing phase, involving reviews of actions undertaken, which guide further action</td>
</tr>
</tbody>
</table>

**Table 2.1:** Wilson's six-stage model of information seeking  
(Source: Wilson, 1997, p. 564)
This model has not been empirically tested; it is derived from a review of the literature. Clearly, there are parallels with Kuhlthau’s model and Taylor’s four levels of information needs that describe the progression of an individual with an information query (1968) – visceral need, conscious need, formalized need, and compromised need. For example, Wilson’s intention phase is similar to Taylor’s conscious level and Kuhlthau’s selection stage. Also, Wilson’s design phase is related to Taylor’s formalized level of information need and Kuhlthau’s pre-focus formulation stage.

2.2.2.3 Model of health information acquisition

Freimuth, Stein, and Kean (1989) developed a six-stage model of health information-seeking behaviour that is similar to Kuhlthau’s model. Their model is influenced by Bettman’s consumer information-processing model (1978) which posits two forms of information seeking – search (active) and being confronted (passive). Active searching can be internal or external. Both internal and external searching are affected by three factors – direction (source/channel selection), degree – how much information is sought, and patterns of information seeking. The six stages of health information seeking are stimulus; information goals; cost/benefit analysis of searching; search behaviour; evaluation of information; and decision point on adequacy of information (p. 9). A stimulus may be internal, such as symptoms of illness, or external, e.g. mass media health campaign. If personal knowledge is thought to be sufficient, or if the individual is not concerned about the stimulus, then uncertainty is not experienced and information seeking does not occur. However, if there is uncertainty about health messages or personal symptoms, for example a skin rash, then a search is initiated.
Before an active search actually occurs, individuals weigh the advantages and disadvantages of conducting an active search for health information. Benefits include resolving uncertainty, decreasing anxiety and increasing sense of control. Disadvantages include time and financial cost, emotional distress, confusion, and social consequences associated with revealing ignorance (p. 10). Next, search parameters are set. A decision is made regarding how much information is required, how long the search process should be, and what sources and channels of information are adequate. (p. 11).

Once information has been gathered, it must be evaluated in terms of the costs/benefits ratio. The goal of processing information is to reduce uncertainty. All information processed is stored in the individual’s memory and can be accessed the next time a similar situation occurs (p. 12). At some point a decision must be made regarding the termination of the search. If the search takes too long or causes even more uncertainty and confusion, it is likely that it will be terminated.

2.2.3 Orientation to information: monitoring and blunting

Many theories of information seeking behaviour tacitly assume that individuals are interested in resolving uncertainty. However, Wilson (1997) and Allen (1996) point out that not everyone is motivated to make sense of each situation. Research in the field of medical sociology and in information science supports the existence of two orientations to health information.

Two types of coping were identified by Lazarus and Folkman (1984); problem-focused coping (cognitive) and emotion-focused (affective) coping. Cognitive-based information needs are met by factual information, while affective needs are met by information on emotional aspects of illness (Johnson and Meischke, 1991). Wilson (1997) suggests that affective health information needs are very important because illness and medical treatment are associated with strong emotion.
Krohne’s two-dimensional model of coping (1986, 1989) is used to examine the relationship between coping and information needs. Two cognitive states in this model govern the individual’s response to adversity and are related to likelihood to engage in information seeking. **Sensitization** is marked by intolerance of uncertainty and low cognitive avoidance and results in constant monitoring. **Anxiety** is marked by high intolerance of arousal and results in fluctuating coping. **Monitoring** and **blunting** represent the behavioural counterparts of the cognitive states, sensitization and repression, also referred to as attention and avoidance (Miller and Mangan, 1983).

Monitors are likely to ask for a lot of information to help deal with a stressful event, while blunter s cope by ignoring stress; they avoid actively looking for information (Wilson, 1997, p. 556). The adoption of monitoring or blunting strategies has been linked to personality variables such as **locus of control**. Monitors exhibit internal locus of control; they believe they are in control of their life and responsible for their decisions. Blunters exhibit external locus of control, also referred to as a wishful-thinking mentality. (Allen, 1996, p. 91) The blunting strategy can be viewed as a personal barrier to information seeking.

Monitors likely possess a high **need for cognition**. This cognitive style variable, which encompasses the need to know, the desire to be informed, and curiosity, is thought to act as a general drive for information seeking (p. 553). This is supported by findings from a study conducted by Johnson and Meischke (1993). They found an individual’s propensity for health information seeking is not related to a specific health situation experienced by the individual but to a general attitude about self care. **People who tend to seek information, in general, are also likely to seek health information.** Need for cognition may be related to social situations. Allen (1996, p. 92) argues that women are more likely to be exposed to these situations, perhaps because of their traditional social role as caregivers. Thus, need for cognition is affected by social norms.
In the communications literature, need for cognition is referred to as “need for orientation”. It has been found to be a better predictor of mass media use (source selection) than a stated need to go to the mass media for specific information (Weaver, 1980), demonstrating that there is a relationship between need for cognition and source selection. Need for cognition is also thought to be related to non-instrumental or intrinsic information seeking (Atkin, 1973). This type of information seeking is similar to Wilson’s (1997) concept of ongoing search.

However, Allen (1996, pp. 90-91, 120) argues that people cannot be divided neatly into monitors and blunters. Instead, their orientation to information may depend on the type of information available and the individual situation at any one time. He notes that blunting can be either disadvantageous or advantageous, depending on the situation and the personality of the individual concerned. Previous studies found blunters tend to have poor psychological health and get sick more often than monitors. However, blunting can be a positive coping strategy. For example, blunting reduces stress in children about to undergo surgery.

Several studies support the importance of situation, at least in terms of health status, on monitoring and blunting. Pierce (1993) conducted a study on monitoring and blunting in breast cancer patients. He labelled breast cancer patients in his sample as deliberators, deferrers, and delayers. Most patients belonged in the latter categories, which are equivalent to blunting. The high percentage of blunters in this population may be attributed, not unreasonably, to treatment success and prognosis for breast cancer, often a highly malignant disease. Because there are no completely effective treatments for breast cancer, and existing treatments have many serious side effects, blunting may be a normal response. Breast cancer patients may not want to know about treatment options because they are all equally unpleasant. Furthermore, undertaking a rigorous regime of
chemotherapy may not result in treatment success and even after a lengthy remission, cancer can reoccur in the future. In this study, blunting may be related to poor prognosis. However, this relationship was not studied.

A recent British study of cancer patients’ information needs and information-seeking behaviour (Leydon, Boulton, Moynihan, Jones, Mossman, Boudioni & McPherson, 2000) lends support to these assumptions. Researchers found all patients wanted basic information about diagnosis, treatment options, and the side effects of treatment. However, they varied in the timing of their need for information, as well as the amount of content and detail. Furthermore, they found patients’ attitudes towards information seeking were based on their attitude towards the management of their cancer. Those who exhibited blunting were more likely to find their experience with cancer, and information about cancer, rather daunting. This group tended to place their faith in their physician’s expertise. Furthermore, they felt information seeking would be perceived as violating their role as patient, reflecting the Parsonian concept of the sick role (Parsons, 1951). Thus, social norms around the patient-physician relationship affected orientation to information. For the most part, a blunting orientation was typical of elderly patients. Interestingly, female patients often valued the knowledge and experience of other cancer patients over medical information, which aided them with decision making concerning treatment. A cultural peculiarity of this study was patients’ attitudes towards information as something that should be rationed. They deliberately curtailed their information seeking because they did not want to take up their doctors’ time and deprive other patients of the resources of healthcare facilities.

Is monitoring and blunting a personality trait or a cognitive style variable that changes in response to the situation? To resolve this conflict we draw on the minimax hypothesis developed by Miller (1979, 1980), which addresses the issue of control. Simply stated,
individuals are motivated by a desire to minimize exposure to danger. Consequently, individuals prefer and are less stressed by control, when having control enables them to put an upper limit on how bad the situation can become. Normally, one’s actions are the most reliable guarantee of this limit. However, when another person’s responses are a more reliable indicator of minimizing aversiveness than one’s own, having control is not preferred, it is stress-inducing. In these situations, for example, medical treatment of a life-threatening condition, the individual will likely relinquish control to their healthcare practitioner.

What is important is the amount of control a person perceives that they have, not the actual amount of control, for perceived control determines the type of coping strategy employed. Monitoring is employed when an aversive event is perceived by the individual to be controllable, enabling the individual to perform controlling actions. However, when an aversive event is perceived as uncontrollable, blunting is the common response because monitoring has no instrumental value in this situation. Consequently, information is not preferred. It is arousal-inducing because the individual is forced back into the psychological presence of a danger she cannot avoid (Miller, Combs & Stoddard, 1989, pp. 108-109; Evans, 1991, pp. 34-39). While this psychological explanation intuitively makes sense, it fails to consider the influence of social norms on orientation to information, such as gender roles and patient-physician dynamics. Wilson (1981, p. 10) sees social settings as creating motivations to seek information to satisfy affective needs; social setting is tied to emotional coping.

Overall, monitoring and blunting represent two orientations to information mediated by situational variables and social norms. Social norms in the past encouraged both men and women to be the passive recipients of healthcare services. Asking for health information represented a violation of the Parsonian sick role. However, in today’s information society, and given the environment of healthcare cutbacks, individuals are encouraged to seek
health information to prevent illness, thereby reducing their reliance on public health services. For women, health information seeking can be seen as part of their role as society’s health guardians. Furthermore, healthcare practitioners involved in disseminating information to patients and the public, e.g. nurses and teachers, tend to be women. Thus, health information seeking has become a social norm, and more so for women than men. Apart from social norms, personal control of the situation also affects orientation to information. Most individuals are monitors unless the situation is uncontrollable. When faced with a negative change in health status, which gives rise to uncertainty, individuals may seek information if they perceive the situation as controllable, or avoid information if they find situation is uncontrollable.

The perception of control is affected by several situational variables. One, the type of health condition the patient (or her dependants) is experiencing is of some relevance. Incurable, chronic, or stigmatizing conditions are often perceived as uncontrollable. Two, the patient’s relationship with her health care provider affects her perception of control. Is her practitioner empowering her or disempowering her? Third, her ability to pay for treatment and take time off from work determines perceptions of control; those who can afford treatment and can leave work without penalty, e.g. salaried employees versus contract staff, should experience more control over their health situation. As well, attitudes of social network members are important. Do family members and relatives provide support during her illness, or is she left to fend for herself?

2.2.4 Wilson’s general model of information seeking behaviour

Tom Wilson has advanced several models of information seeking behaviour over a span of twenty or more years, for example, the six-stage acquisition process, which was described in section 2.2.2.2 on page 22. His most cited model (1971) conceptualizes the individual seeking information to meet physiological, affective, and cognitive needs, a model which has
particular resonance for the domain of consumer health information because of the importance of personal context. According to Wilson, the individual’s context, in terms of social roles, such as the work role, and the environment, which includes a consideration of the physical environment, the work environment, the socio-cultural environment, and the politico-economic environment, may initiate an information need.

In the late 1990s (Wilson, 1995, Wilson and Walsh, 1996, Wilson, 1997, 1999), this model of information seeking behaviour was revised considerably to take into consideration new research on information seeking behaviour from several disciplines, including consumer studies, information system development, health informatics, and other fields. The revised model is considerably more complex, but the fundamentals of information seeking remain more or less the same. To be specific, the individual and his or her context drive the information need. Taking action to resolve an information need is related to stress-coping theory (Folkman 1984). Stress is posited as the first activating mechanism. The more stress the individual information seeker experiences, the greater the motivation to seek information, but not indefinitely, as a high level of stress may paralyze information seeking. Stress affects several intervening variables, including, psychological, role-related or interpersonal, demographic, environmental, and source characteristics. A second activating mechanism is proposed from risk-reward theory (Settle and Alreck 1989) and the theory of self-efficacy (Bandura, 1977). This activating mechanism is the amount and nature of perceived risk and the perception of self-efficacy, the individual’s perception of their ability to successfully execute a task or behaviour, in this case, information source selection and use. Information use is conceptualized in terms of four orientations or dimensions: passive attention, passive search, active search, and ongoing search. This model was developed and validated from Wilson’s detailed analysis of the information behaviour of social workers and their managers in Project INISS (Information Needs and Information Services in Local Authority Social Services Departments).
2.2.5 Anomalous states of knowledge

Belkin (1977) proposed the concept of anomalous state of knowledge (ASK) within the context of a communication framework that conceptualizes the information seeker, as the communication recipient who experiences a conceptual state of knowledge that is anomalous with respect to some goal and desires to resolve the anomaly, also referred to as the problematic situation by querying a set of texts. The anomaly is the state of inadequacy which is reflective of lack of knowledge and uncertainty concerning how to apply existing information to the problem. This cognitive perspective of information seeking, known as the cognitive viewpoint, includes information retrieval as a component of information seeking and seeks to apply ASK to the design of information retrieval systems (Belkin, Oddy, and Brooks, 1982; Belkin and Kwasnick, 1986, Belkin, 1990). The communication system comprises the dynamic interactions between different states of user knowledge, which lead to modified ASKs, and the problematic situation.

2.2.6 Integrative framework for information seeking and interactive information retrieval

Ingwersen (1992, 1996, and 2001) posits information seeking and retrieval as a process of cognition for the information seeker in context. In his general model of cognitive information seeking and retrieval, information seekers can be individuals or teams, influenced by social context, cultural factors, and organizational factors. Interaction with information objects through the interface of the information retrieval system entails a consideration of information system factors, such as interface functionality. In common with Dervin, Ingwersen envisions information seekers as shaping their environment. According to Ingwersen (2006, p. 216), “The framework strongly suggests the laboratory (Cranfield) model to become extended toward the searchers’ interactive situation in context and increasingly involving dynamic non-binary relevance conceptions and realistic experimental settings. Similarly, the algorithmic components should be integrated in IS studies.”
2.2.7 Marchionini's four levels of information seeking and information retrieval

From a structural perspective, information seeking can be regarded as comprising activities of different scope. Marchionini (1995, p. 71) classifies active information seeking according to four overlapping levels of granularity – patterns, strategies, tactics and moves. These are not mutually exclusive approaches to information seeking: each step or stage of Kuhlthau's process-oriented theory can be seen as involving patterns, strategies, tactics, and moves. Both activity-based and structural approaches to information seeking are discussed in this section.

**Moves** are the physical actions taken to execute a search, such as pressing keys. They represent finely grained information-seeking activities, which can be unobtrusively observed for research on information-seeking behaviour. More importantly, moves are the manifestations of tactics and consequently, the visible signs of intellectual activity. However, moves are mainly system specific; they are reflective of interface functionality. Consequently, Marchionini does not attempt to match moves with strategies (p. 74).

**Tactics**, in turn, represent discrete intellectual choices or prompts. Tactics often apply inferences that advance information seeking and are part of information-seeking subprocesses. They are task and system-specific. Again, Marchionini does not elaborate further (p. 74).

**Strategies** are sets of ordered tactics. They are deliberately selected, implemented, and monitored, to handle an information problem. Each strategy represents an approach to an information problem and comprises multiple subprocesses. Strategies can be seen as existing on a continuum. *Analytical strategies* are formal strategies. They are goal driven and require planning. Consequently they are most useful when time is limited. *Browsing strategies*, on the other hand, are informal, opportunistic, and interactive approaches to information seeking.
A starting point is chosen and the information seeker progresses according to cues coming from the data during the search process. Because browsing strategies depend on interaction, they are ideally suited to hypertext systems such as the Web (pp. 72-74).

**Patterns** represent the coarsest level of granularity. They reflect the internalized behaviours of individuals. Patterns may also be the reflection of personality traits, cognitive style, and attitudes. One example of an information-seeking pattern is orientation to information, more specifically, whether one is inclined to seek information or avoid/refuse information, also referred to as monitoring and blunting (Miller and Mangan, 1983). Patterns only become recognizable over time and through exposure to different information problems and searches. Patterns may be the result of the strategies and tactics that have become internalized through experience. For example, introverted individuals who prefer searching on their own are more likely to utilize electronic information systems and avoid using human information systems because the latter require interpersonal communication. Groups of actions may be automatically selected, becoming, in effect, default actions for a set of information problems. Domains and search systems also influence patterns (p. 72).

### 2.2.8 Summary of theories and models of information seeking behaviour

Wilson (1997) identified four types of information-seeking behaviour: passive attention, passive search, active search, and ongoing search. A linear, stage-based theory of information seeking behaviour describing the shift from uncertainty to clarity, as well as increased interest and motivation during the stages of the search, has been developed by Kuhlthau (1989, 1991, 1993). A health-specific variant was developed by Freimuth, Stein, and Kean (1989). However, stage-like, process-based theories of information seeking may not be suited to the Web environment. According to Bates (1989) and Marchionini (1995), hypertext-based information systems encourage informal, opportunistic, and interactive approaches to information seeking. This interactive approach is characterized by deviation
from the sequential pattern of subprocesses. Furthermore, Kuhlthau (1991, p. 369) found subjects did not follow a linear sequence of information-seeking steps. Instead, they frequently engaged in recursive and iterative searching. Wilson (1999, p. 266) proposes that the stages can be seen as iterative steps that lead to increased problem resolution.

Theories of information-seeking behaviour that delineate factors affecting the search process, such as Wilson’s general model, and the interactive information retrieval models of Belkin and Ingwersen, respectively, provide the basis for selecting variables for empirically researching the information seeking process of women seeking health information on the Web. From the models developed and validated by Wilson, Kuhlthau, Dervin, and Belkin, it is evident that uncertainty associated with information need arising from a problematic situation can initiate the information seeking process. However, research on monitoring and blunting in the health discipline reveals that individuals do not necessarily undertake information seeking when they encounter a difficult situation, in fact, individuals referred to as blusters engage in information avoidance. Apart from information need, information source characteristics, social roles, situational factors, and socio-demographics, have also been identified as key factors affecting information seeking behaviour. In the next section of this chapter, research pertaining to these factors, and their influence on information seeking, are described.

2.3 Early research on women’s health information on the Web

Wootton (1997) provided an overview of the benefits of seeking health information on the Internet and asserted that the advantages of online health information seeking outweigh potential risks. She profiled several health information websites that cover women’s health. In a similar vein, Marton (1999) provided an overview of Internet-based consumer health initiatives for women that have their origins in Canada and the USA. She compared Internet resources designed by women’s groups with those created by
government, universities, hospitals and the corporate sector in terms of the quality and breadth of health information provided. Developments in website design and implications for the future provision of consumer health information were also discussed. Mbambo (1999) described Internet initiatives for African women and challenges in Internet access and use, including the need for ICT skills; access to computers and telecommunications, including wireless connections, and the digitization of African women’s information. Overall, these early studies are descriptive in nature; they do not study women’s use of information sources, but simply report on the availability and quality of existing health information resources on the Internet.

Marton (2000) conducted an evaluation of the prototype of Women’s Health Matters (WHM), a consumer health information website developed by Sunnybrook and Women's College Health Sciences Centre (renamed Women’s College Hospital in 2006 to reflect the de-merger of these two hospitals) and The Centre for Research in Women’s Health (renamed Women’s College Research Institute). Study participants were women, primarily between the ages of 20 and 29, well educated, and experienced Internet users. Participants viewed the WHM website prototype in a computer laboratory setting. They then completed several search tasks and a questionnaire, and discussed their perceptions of the website in a moderated focus group setting. Participants found the text-based content on the WHM website interesting, easy to understand, and useful. However, they experienced difficulty navigating the website using the website's navigational elements - hypertext links and site search engine. They wanted to see more graphical elements added to the website. As well, they wanted communications channels, such as newsgroups, listservs and chatrooms, provided they are moderated by healthcare practitioners. They were not favorably disposed toward advertising on consumer health websites.
In 2001, the results of an environmental scan on women’s health information resources in the province of Ontario, and more broadly, in Canada and the English-speaking world, was published (Marton, 2001). This comprehensive multi-method study on the availability and quality of health information resources on all topics pertaining to women’s health in 2000 revealed several gaps. There were an extensive number of health information resources in multiple formats (print, electronic, and Internet) but on a limited number of topics, mainly pertaining to reproductive health and illness, for example, breast cancer. Consumer health information publications on other health conditions that affect a large number of Canadian women, such as lung cancer, heart disease and stroke, were not widely available. As well, existing consumer health information publications on those health conditions did not take into consideration gender differences in symptoms and treatments. Moreover, very few health information resources were published in languages other than English, including French. Inclusiveness of health information content in existing publications in terms of culture, race, religion, and sexual orientation was also found to be lacking.

Marcella (2001) comprehensively evaluated women’s sites of the Internet, including several health websites that support women’s interaction and participation in a variety of activities. She concluded women’s sites offer useful information, they are easily accessible, but may contain commercial elements. She noted that there were few interactive features available to support networking, and there was insufficient information about authorship and reliability.

2.4 Factors affecting health information seeking on the Web

2.4.1 Health information need and uncertainty

“Information needs set the context in which users employ information systems and services, and they provide the criteria against which the performance of those information systems and services can be evaluated.” (Allen, 1996, p. 56). For women seeking health information on
the Web, an important consideration is the nature of health information needs, which are predicted to be reflective of women's health status, in terms of the health conditions experienced by women.

2.4.1.1 Typologies of information needs

Deficiency in knowledge or understanding is the underlying principle for theories of information need. This has been called the uncertainty principle (Kuhlthau, 1991, 1993), the gap (Dervin, 1983, 1992), an anomalous state of knowledge (Belkin, 1980; Belkin, Oddy, and Brooks, 1982), the visceral and conscious level of information need (Taylor, 1962, 1968), and an unstable collection of noumenal clouds (Marchionini, 1995).

The cognitive approach to information needs has given rise to a number of information needs typologies, including Dervin's typology of sense-making gaps (1992); MacMullin and Taylor's typology of information needs (1984), Taylor's typologies of information needs (1969, 1991), and Allen's typology of knowledge gaps (1996, 1997). Wilson (1997) adds two affective needs: a need to elucidate and a need to confirm personal beliefs and values.

These typologies differ in granularity. At the macro level, one could classify health information needs according to Dervin's gap categories (1992). Allen's three types of information needs (1996) and Wilson's typology of information needs also represent macro level approaches. At the meso level, Taylor's eleven problem dimensions (1991) could be utilized. There is some degree of overlap between problem dimensions and Dervin's categories. For example, Dervin's stop categories are equivalent to the simple limit or extremity of Taylor's third problem dimension while Dervin's embeddedness categories are similar to the complex extremity of Taylor's third problem dimension.
At the most specific or micro level, health information needs could be classified by health topic, as is commonly done in the largely atheoretical field of consumer health information studies. Reports on the use of consumer health information centres (CHIC) classify health information needs according to health topic. There are similarities in the health topics most frequently requested at each CHIC. The most popular category of health information needs is diseases and disorders, followed by treatment, medication, health promotion, and, at American CHICs, choosing a physician (Arcari and Richetelle, 1991; Reidelbach, Weaver, and Epperson, 1991; LaRocco, 1991; Marshall and Taylor, 1993).

The most popular health topics often pertain to women’s health. Information about pregnancy and childbirth, sexually transmitted diseases and AIDS, and human sexuality, in general, is frequently requested (Michaels, 1991; Arcari and Richetelle, 1991; Dervin and Clarke, 1987). At Saint Joseph Hospital Health Reach Library in Denver, popular topics included psychiatry/psychology, women’s health, pediatrics, heart disease, and cancer (Bandy, 1991). It is plausible that health topics investigated by users of CHI services reflect personal health status, or the health status of loved ones. The finding that use of health information sources and amount of information seeking intensifies when the topic is of interest or salience to the information seeker (Davison et al., 1982) would seem to support this hypothesis. Similarly, Chew (1992) found that greater amount of information seeking and depth of information processing occurred when the news topic was special or urgent, instead of regular news programming.

With respect to health topics of interest to Internet users, a JD Power/BetterHealth online survey conducted in 1998 revealed 63% of health-related information sought on the Internet was disease-specific, while 56% pertained to nutrition and diet, and 50% was related to treatment.
Both medication and fitness were topics of interest for 41% of online health information seekers. Alternative care, side effects of medication, and doctors, were also identified as topics of interest. Women’s top health concerns were reproductive health, pregnancy and infant care, family medicine, mental and emotional well-being, female cancers and aging. (Intel Corporation, 2000). 1995 mortality statistics from the US National Center for Health Statistics indicated heart disease, cancer, and stroke to be the most common causes of death for American women (Anderson, Kochanek, and Murphy, 1997). A Cyber Dialogue (1999) survey revealed online chronic condition sufferers are roughly gender balanced (51% female, 49% male) and fifty years of age and older.

2.4.1.2 Relationship between health information need and health condition

Information-seeking behaviour arises from information needs or problems, which are thought to cause uncertainty (Wilson, 1981, 1997; Kuhlthau, 1989). There are many ways of categorizing information needs. In consumer health studies, they are commonly classified according to health topic, as mentioned earlier. I propose, based on the uncertainty principle that forms the cornerstone of many theories of information-seeking behaviour, that amount of uncertainty associated with a health condition is positively related to the amount of health information seeking undertaken. According to Choo (2000), situational complexity affects information needs. One aspect of situational complexity is perceived environmental uncertainty, defined as a lack of information about environmental factors, lack of knowledge about the outcome of an action, and inability to assess how environmental factors affect success or failure (Duncan, 1972). One issue to bear in mind when operationalizing health information need according to personal health conditions is that health status is not static: health conditions can resolve themselves, they may be treated successfully, or they may worsen over time. It is predicted that personal health conditions that engender great uncertainty will affect the intensity of health information seeking on the Web. However, this relationship has not been empirically tested to-date.
2.4.2 Family Caregiving

Of importance to women's health information-seeking behaviour is the caregiver role because women look for health information not only for themselves, but also for others (Marshall, 1992; Pifalo, Hollander, Henderson, DeSalvo and McGill, 1997). According to Leckie and Pettigrew (1997, p. 102), "information seeking is highly related to the enactment of a particular role and its associated tasks."

According to Allen (1996, p. 93), "One of the most socially embedded health information needs are those of the caregiver or family member." Women, in particular, middle-aged women, are overwhelmingly the caregivers for sick and/or aging family members because of social norms (Hoffman and Mitchell, 1998; Dautzenberg, Dieders, Philips, and Stevens, 1998; Guberman, 1999; Paoletti, 1999). According to the Maritime Centre of Excellence for Women's Health (1998), over 2.8 million Canadians, mostly women, provided home care/caregiving services to someone with a chronic illness or disability in 1996. As the population ages, more women will be taking care of aging parents. While only 16% of Canadian women over age 50 had a surviving parent in 1960, by 2010 the percentage will rise to 60%. Rutman (1996, p. 90) states, "Caregiving most often is women's work—regardless of whether the care is provided to children or to elders, whether the labor is paid or unpaid, whether the care is delivered in home or in institutional environments." A study of 293 women from four birth cohorts in upstate New York by Moen, Robison and Fields (1994), revealed one-quarter of women became caregivers at ages 35-44, and more than a third of this group of women became caregivers at ages 55-64. Thus, the caregiver role is one role that disproportionately belongs to women.
However, the caregiver role is not the only role women possess in which information seeking occurs. Metoyer-Duran (1993) has investigated the relationship between the gatekeeper role and information seeking in her research on ethnic and cultural groups. Here, gatekeepers are individuals who are able to deal with two cultures and often link their communities with information resources. Since women are disproportionately paid caregivers, such as nurses, they are involved in information seeking activities such as conducting searches on nursing databases as part of their work role. Because of their knowledge of health and illness, health literature, and their familiarity with the healthcare sector, they often act as health information sources for others’ health information seeking. While the gatekeeper role is acknowledged as an important one, this study investigates women’s health information seeking as family caregivers. It does not specifically address the gatekeeper role. In this study, one can infer whether a participant is a health information gatekeeper from demographic data on occupational status.

Feick, Hermann and Warland (1996) found that women looking for nutrition information on food labels were motivated by concern for their children. Several studies on caregivers of patients have found that caregivers are interested in learning how the disease progresses and its treatment. Caregivers also request information on support services that provide emotional coping resources, such as counselling (Fortinsky and Hathaway, 1990; Meissner, Anderson and Odenkirchen, 1990). A Japanese study of family caregivers (all female) of dementia patients examined the efficacy of group structured intervention on caregiver stress. Five weekly sessions consisting of an educational approach, problem-solving techniques, psychological support, and relaxation, were found to significantly improve caregiver scores on depression, anger-hostility, fatigue, anxiety-mood disorder, and physical symptoms. Providing women with information on how to cope with the caregiver role is of benefit to them in alleviating mental and physical stress associated with unpaid family caregiving, thereby improving their personal health status.
It is predicted that caregivers engage in health information seeking more frequently than women who are not caregivers. However, information seeking by caregivers may break down when the family member has a stigmatizing condition, such as a mental health condition (Main, Gerace, and Camilleri, 1993; Sontag and Schact, 1994; Sonuga-Barke, Thompson, and Balding, 1993). This blunting response is predicted by Chatman’s theory of information poverty (1996) and Goffman's work on stigma and impression management (1963). As attitudes toward stigmatizing health conditions, including mental illness gradually change from stigmatization to acceptance and support, blunting may be less common in the present day. Thus, this study posits that family caregiving leads to increased intensity of Web use for finding health information online.

2.4.3 Web self-efficacy

General self-efficacy is a well established construct developed by Bandura (1977). It is defined as "a person’s estimate that a given behaviour will lead to a certain outcome. It affects whether an individual will attempt to cope with a situation, and the duration and intensity of coping actions." Self-efficacy is considered to be one of two major cognitive forces driving behaviour. Other motivational constructs are self-esteem, locus of control, perceived control and self-reliance (Baron and Rodin, 1978; Grimaldi and Goette, 1999; Lowry, 1989; Gist, 1987). Self-efficacy has been found to determine the amount of effort exerted and the degree of persistence in attempting a specific behaviour, as well as the actual performance attainment of the individual with respect to that behaviour (Barling and Beattie, 1983). Compeau and Higgins (1995, p. 192) describe three distinct but inter-related dimensions of self-efficacy judgments. They are magnitude – the level of task difficulty believed to be attainable; strength - the level of conviction about the judgment and resistance to disconfirming information; and generalizability – the extent to which perceptions of self-efficacy are limited to particular situations.
According to Compeau and Higgins (p. 191), computer self-efficacy is a specific type of self-efficacy pertaining to the individual’s perceptions of her ability to use computers to accomplish a specific task. In their study of computer self-efficacy, they found that this variable had a significant influence on individuals’ expectations of the outcomes of using computers, their emotional reactions to computers, and most importantly, their actual computer use (p. 189). Subjects with high computer self-efficacy had less anxiety about computers, enjoyed using computers and used computers more than subjects with low computer self-efficacy (p. 203). The relationship between self-efficacy and the use of computers has also been identified by Hill, Smith and Mann (1986, 1987), and Taylor and Todd (1995).

Adapting this definition of self-efficacy to Web use, we can define Web self-efficacy as the individual’s perceptions of her ability to use the Web to accomplish a specific task. Web self-efficacy does not refer to simple component skills, such as using the “Back” button in the Web browser. Effectively navigating the Web using a Web browser or retrieving information from a Web search engine are two examples of Web self-efficacy. Compeau and Higgin’s three dimensions of computer self-efficacy can be adapted to Web-based information seeking, as follows. High magnitude would refer to accomplishing complicated tasks, such as a directed search on a Web search engine using nested Boolean operators. High strength would refer to having confidence in one’s ability to accomplish the task. High generalizability would refer to displaying high self-efficacy judgement for related tasks, such as using Web browser preferences to set up email and newsgroup server settings.

In summary, it is proposed that Web self efficacy exerts a positive influence on intensity of health information seeking on the Web: women who rate highly their perception of their ability to use the Web effectively are predicted to be frequent users of the Web.
2.4.4 Information Source Characteristics

The term information source, also referred to in the communications research literature as media channel, encompasses both the content as well as the means of distributing the information or communication itself. The Web is regarded as a *type of information source and a communication channel*. In the same vein, books are a type of print source and television is a type of mass media source.

Information source selection and usage is predominantly seen as a cognitive-rational decision-making process. This approach is common to the value-expectancy models of health behaviour change, such as the health belief model (Rosenstock, 1966, 1974); information foraging theory (Sandstrom, 1994; Pirolli and Card, 1995; Pirolli, Pitkow, and Rao, 1996), and risk/reward theory, which is mentioned in metatheoretical approaches to information behaviour (Wilson, 1997; Choo, 1999). In general, the benefits of using a particular information source are weighed against the disadvantages of its use.

Based on a review of the literature conducted by Choo (1993), there are two variables to consider: information source quality and accessibility. For women’s health information-seeking behaviour on the World Wide Web, both variables are of concern. The chronological sequence of events places access before quality, women must first be able to access the World Wide Web in order to determine the quality of health information resources online. However, if barriers to access diminish, concerns regarding the quality of information on the Web will be foremost in users’ minds.
2.4.4.1 Information source quality

Information source quality is commonly measured in cognitive terms, in the context of information retrieval. **Relevance** is the foremost measure of source quality. Relevance of information is judged with respect to how well the output from an information retrieval system matches the user’s query (Harter, 1986). A subjective view of relevance takes into consideration how users judge relevance, based on their knowledge, experience and situation. This type of relevance is called **pertinence** (Buckland, 1983). Others regard pertinence as a separate construct that takes into consideration the specific pattern of thought in an individual’s mind at the time of information retrieval (Foskett, 1972). In recent years, the focus has shifted from system relevance to **user-defined relevance**, with information retrieval researchers focusing on how users define relevance (Park, 1993, 1994), and, particularly, the multidimensionality of the relevance construct, with more attention devoted to the dynamic, situational dimension of relevance (Wilson, 1973; Schamber, Eisenberg, Nilan, 1990; Borlund, 2003).

**Situational relevance** was first defined by Patrick Wilson in his landmark paper (1973, p. 473), as follows, “Situational relevance is relevance to a particular individual's situation—but to the situation as he sees it, not as others see it or as it “really” is…. But we do not care about every feature of our situation; not everything is of concern to us. Situational relevance is to be confined to aspects of our situation that concern us.” The information retrieval concept of situational relevance is not to be confused with the broader socio-anthropological concept of “situatedness”, which Rohlfing, Rehm, and Goecke (2003, pp. 132-133) defines as, “the close relation between an individual and its environment, and the influence of this relation on the nature and development of the individual itself.”

The shift away from system relevance towards user-defined relevance, in particular, situational relevance, has undoubtedly been hastened by the advent of the Web in the mid-1990s.
This vast online information retrieval system can be readily accessed by end users through their personal computers, and is searchable through easy-to-use Web search engines such as Yahoo! and Google. Keyword searching by the public using Web search engines stands in direct contrast to the earlier IR environment of expert-mediated searching.

**Reliability** is defined as “the trust a user has in the consistency of quality performance of the system and its outputs over time” (Taylor, 1986, p. 64). This measure of quality takes affect into consideration, which is particularly important in health, given the prominence of emotions in health decision-making. A related construct from social network theory which has penetrated the field of information science in recent years is **information legitimation**, which refers to the legitimacy of the sender as a source of information (Haythornthwaite, 1996). Nilan and colleagues (Nilan, Peek and Synder, 1988; Halpern and Nilan, 1988) have identified fifteen source criteria, including “authority based on credentials”, “authority based on expertise”, and “trust”. These criteria could be used to operationalize the construct, **perceived information source quality**, for survey questions on source selection and usage.

Privacy, confidentiality and security of Web access are attributes of the construct “trust” that are potentially of concern to women using the Web to find health information. According to Frisse (1996, p. 1064), "more often than not, while people are learning from the Web, the Web will be learning about them." Cookie files and server logs enable website administrators to gather information about users. This could adversely affect the "trust" women accord the Web, given the sensitive nature of health information needs. Privacy concerns are likely to increase as, according to the Georgetown University's Health Privacy Project, health websites are violating their own privacy policies by using cookies to collect information on website users. Some have been found to pass that data along to third parties (Benton Foundation, 2000).
One of the most comprehensive endeavours to develop evaluation criteria for assessing the quality of health information content on the Internet is the set of criteria found in the online publication, *Criteria for assessing the quality of health information on the Internet* (American Public Health Association, 2001). Another authoritative source on medical and health websites is *The Health on the Net Foundation Code of Conduct* (Health on the Net Foundation, 1996). From these documents, the following criteria are seen as essential: accuracy, currency, and relevance of information; providing references for sources, evidence to support claims of treatment efficacy; and a disclaimer. Identification of the purpose of the site; its authors, webmaster and editorial review committee, sources of sponsorship, and advertising material, should also be mandatory criteria for evaluating health websites (Ambre, Guard, Perveiler, Renner, and Rippen, 1997; The Health on the Net Foundation, 1998).

The use of information source quality measures is particularly important for assessing the quality of health information on the Internet, which is highly variable (Health Canada Advisory Council on Health Infostructure, 1999; Lindberg & Mymphreys, 1998). Rating scales have been devised to assess the quality of consumer health websites. However, a review of these rating scales revealed that the criteria used to develop them and information on their inter-observer reliability and construct validity were often not available (Jadad and Gagliardi, 1998).

Starting with the premise that doctors have a duty to help patients assess health websites, Eysenbach, Diepgen, Gray et al. (1998) proposed a rating system that uses a standard vocabulary of machine-readable metadata. Their rating system is based on a set of technical standards called **PICS (platform for internet content selection)**, which was originally developed by the World Wide Web Consortium to support Internet filters that
screen out porn and offensive material. This type of automatic downstream filtering enables anyone to distribute electronic descriptions or ratings of digital works across the Internet in a computer-readable form by embedding labels in electronic documents or images, for example, to indicate the appropriateness of the content for particular groups, such as children. Thus, humans or software can rate websites and create electronic labels. When a website containing an electronic label is accessed, the user’s software checks its label against the requirements the user has specified by contacting the label service the user is subscribed to. A website with misleading health information would be flagged.

The authors created their own rating vocabulary for health websites, which comprises quality criteria and rating scales.

**MedCERTAIN** (MedPICS Certification and Rating of Trustworthy Health Information on the Net) is an international metadata project funded by the European Union’s “Action Plan for safer use of the Internet” (Eysenbach, Diepgen, Lampe, and Brickley, 1999; Eysenbach, Yihune, Lampe, Cross, and Brickley, 2000). It attempts to provide both a technical infrastructure and a conceptual basis for a global system of quality seals, ratings and self-labelling of Internet health information. The purpose of this large-scale initiative is to establish a global “trustmark” for online health information.

Clearly, the criteria for information source quality established through information science research and the set of criteria developed by health care providers and agencies to assess the quality of health information on the Web are very similar. Accuracy, currency and relevance are familiar attributes of information source quality. Identifying the author(s), webmaster, and editorial review committee, is equivalent to the construct of authority developed by
Nilan and colleagues. Providing references for sources, evidence to support claims of treatment efficacy, disclaimers, and sources of advertising, are dimensions of trust, itself an attribute of reliability. In recent years, Rieh (Rieh and Belkin, 1998, 2000) has researched judgment of information quality and cognitive authority on the Web. Authority is an underlying theme in information source credibility; both individual authority and institutional authority are attributes of information source credibility that are of concern for information seeking on the Web. The Web was regarded by study participants in these studies as less authoritative and credible than other information systems.

In this study, both attributes of perceived information source quality, relevance and reliability, are considered important information source characteristics that are predicted to individually influence intensity of seeking health information on the Web.

2.4.4.2 Information source accessibility

Accessibility comprises several considerations, including social and economic costs, physical access, and ease of use (of equipment). Culnan (1985) suggests that perceived source accessibility, which she defines as the “expected level of effort required to use a particular information source” (p. 302), is a better measure than source accessibility. Clearly, information source accessibility must be related to perceived information source accessibility because perceptions of information source accessibility are based, at least in part, on objective measures of information source accessibility. While objective aspects of information source accessibility are discussed in this section, it is understood that perceived information source accessibility is derived from the individual’s interpretation of the impact of these variables on her situation.
The **access rainbow framework**, a seven-layer conceptual model of access to the information/communications infrastructure developed by Clement and Shade (1996, 1998) provides a useful model for the consideration of dimensions of Internet accessibility. The seven layers are carriage facilities, devices, software tools, content/services, service/access provision, literacy/social facilitation, and governance. The lower layers deal with conventional technical aspects, such as computer access and Internet connectivity, while higher layers are concerned with the social dimensions of computer and Internet use, such as literacy. Similarly, Kling (1998) distinguishes between physical access to technology, which he refers to as **technical access** and a second kind of access that encompasses the technical skills and professional knowledge required to effective utilize technology, which he referred to as **social access**.

Balka (1997) conducted a gender analysis of Internet access in Canada using the access rainbow framework. At the **carriage facilities layer**, Clement and Shade (1998) note that the telephone system is the principal access mode for digital services in the 1990s. However, that infrastructure did not support single-party line service for all subscribers in rural areas, and in northern communities, basic telephone service was often not available at the time. Balka (1997) and Whitcomb (1999) point out that increased rates for basic telephone services occurred while cuts to welfare and employment insurance were made. In 1998, approximately 127,000 households in Canada discontinued their telephone service, largely because they were unable to pay monthly phone bills, a noticeable increase over the 38,000 Canadians without phones in 1996 (Lawton, 1998). As well, reductions in funding for FreeNets at that time resulted in restrictions in the amount of access users had to these networks (Balka, 1997).

*Because of the income disparity between women and men and the increasing number of single women raising families, these changes affect women disproportionately.*
A related issue is that of **bandwidth**, which is increasingly insufficient to meet Internet user needs. The move to high-speed access with ADSL and cable in the late 1990s was not without hurdles as home and business users reported many problems with this new service (Cribb, 1999; Tuck, 1999; Alaton, 1999). A high-capacity infrastructure, known as CA*net 3 was built by Nortel, and the first segment was completed in 1999 (CANARIE, 1999). However, the government gave prioritized access to this advanced network to businesses, not the general public (MacDonald, 1999). To-date, access to high speed Internet is still severely restricted in rural Canada because Internet providers remain unwilling to make the significant investment required to extend their infrastructure into sparsely populated and geographically remote areas (Marlow and McNish, 2010), a geographic digital divide.

Of particular concern are the **financial costs** associated with Internet use – devices, software tools, and service providers. This is the focus of discussion for layers 2, 3, and 5 of the rainbow model (Clement and Shade, 1998). Financial costs comprise costs associated with computer hardware and software purchases and with obtaining Internet connectivity. The costs associated with reliable Internet access are high and are paid as a monthly utility bill. Furthermore, computer hardware and software have a rapid rate of obsolescence, necessitating frequent upgrades of both, which is a costly proposition.

Mandl, Katz, and Kohane (1998, p. 215) note that Internet connectivity is directly correlated with income and is also unequally distributed across ethnic and racial groups. Are inequalities in Internet access directly related to ethnicity and race? Or are they related to low income, which is historically more prevalent among racial minority groups, but is also characteristic of other demographics, including women and rural inhabitants? This is a subject of ongoing debate in research on the digital divide.
A study comparing a working class town with a college town highlights this digital divide based on income. Researchers found working class town inhabitants had far fewer individuals with personal computers and networked information services in the home (Civille, 1995). In an interview with the New York Times, Dr. Michael Dertouzos, director of the Laboratory for Computer Science at MIT, stated, “I’ve concluded that the information revolution, if left to its own devices, will mean that the rich are going to buy more computers, be more productive and become richer, and the poor will not be able to do that and will stand still” (interview by Dreifus, 1999). Furthermore, those who can afford Internet access are able to seek new opportunities by extending their personal networks. Email and website visits enable Internet users to greatly expand the number of weak ties in their social network (Center for Civic Computing, 1996). Weak ties have been associated with the alleviation of information poverty (Lee, 1969; Granovetter, 1973, 1982).

According to Eng, Maxfield, Patrick, and Deering (1998, p. 1372), “those who are most likely to have health problems and lack health insurance coverage are least likely to have access to the Internet or have the skills to use it.” Low income likely accounts for both disparities in access to health services and disparities in access to the Internet. Robinson, Flowers, Alperson, Norris, and Drew (1999) conducted a survey of 154 predominantly Black and Hispanic patients visiting an outpatient general medicine clinic at an urban medical centre in Los Angeles California between December 1997 and February 1998. They found 85% of participants had heard of the Internet and 64% were aware of the Web. However, less than 20% owned a computer or had Internet access. Still, close to half of all participants were interested and willing to get health information from the Internet and communicate with physicians through email.
Recognizing that financial costs impact women disproportionately because of their lower incomes relative to men across sectors of employment, several women’s groups attempted to provide women with free access to computer terminals. However, their proposals for funding were denied by government funding bodies (Balka, 1997). Indeed, funding to Canada’s largest women’s rights group, the National Action Committee on the Status of Women, was completely eliminated by the federal government in 1998, impairing its ability to address issues of gender-based inequality (Canadian Labour Congress, 1998).

Financial costs are ameliorated by public access to the World Wide Web through computers in public libraries, at least in large urban centres. However, the number of computers per library is generally very limited. Consequently, the time allocated to each individual computer user is limited. Compounding this problem locally, in the 1990s, the Ontario government cut public library budgets while limiting fundraising opportunities (Howell, 1999). However, the Liberal government under former Prime Minister Jean Chretien initiated several Internet connectivity programs in the mid-1990s as part of the “Connecting Canadians” agenda, including the Community Access program (CAP), LibraryNet and SchoolNet. During the same period, the Gates Library Foundation Canadian grant program provided public libraries situated in impoverished communities with computer hardware, software, Internet connectivity, and staff training (Peryman, 1999).

Federal government-funded Internet infrastructure programs have been reviewed by CRACIN researchers at the University of Toronto (Clement, Gurstein, Longford, Luke, Moll, and Shade, 2004). Funding for computers and Internet connectivity in community centres and rural libraries through CAP has enabled the poor and socially marginalized to acquire basic IT skills that they could use to complete their education and pursue job opportunities.
The current federal government announced its intention to eliminate funding for the CAP Program by April 1 2010. This cost-cutting measure was justified because of the economic recession and on the basis of the widespread availability of Internet access in Canada at the present time (Marlow, 2010).

Another potential public access point to the Internet is the healthcare setting. Health librarians, health promotion staff, nurses and patient educators can assist women in gaining the skills to use the Internet and search effectively for health information. However, with shortages in healthcare staff, and Internet connectivity in hospitals and community health centres limited to a handful of staff, this may be a remote possibility.

While the provision of public access to the Internet is a laudable social goal, anecdotal evidence suggests that it does not necessarily translate into increased use by women. Several factors constrain women’s use of public terminals, including, time pressures, lack of willingness to compete with others for access, and inability to get assistance from staff (Balka, 1997). Similarly, even when Internet connectivity is available in the home, the problem of access may still exist. Graham (1984, p. 62), points out that “family resources” are not always allocated in line with responsibilities. She notes several national surveys conducted in the United Kingdom have shown only a few housewives had use of the family car. Most often it is the husband who uses the car exclusively, despite the need for mothers to use the car for family shopping and to take children to the doctor (p. 63). Thus, gender inequality exists in the use of family resources, which may extend to women’s access to the computer at home, the most common Internet access point for Canadians, according to a Statistics Canada report (McHardie, 2000).
An U.S. Bureau of the Census study of individual use of networked individual services lends support to this assumption. In 1993, approximately 34.7 million men (27.9 percent) and 33.9 million women (25.9 percent) lived in households with personal computers. However, 10.9 million men used networked information services from a personal computer at home, but only 2.8 million women. Comparing 1993 statistics with 1989 statistics reveals a widening gender gap in home-based use of networked information services for personal reasons. Education, income, geographic location, and ethnicity are also predictors of use for home computers and networked information services (Carville, 1995, pp. 186-187). Whether these American statistics on gender disparity in home Internet use are generalizable to Canadian household Internet users is unknown. Canadian Internet demographics are discussed in section 1.2.1.

In addition to physical access and cost issues, women must have the skills to use the Internet and navigate the Web. Both financial costs and time constraints are associated with computer and Internet training. With the Internet, complexity includes not only a consideration of the skills and knowledge required to use computers and the Internet, but also the skills to manage the information retrieved. Marchionini (1995) refers to cognitive ability pertaining to the use of an information system as system expertise and to cognitive ability pertaining to information seeking as information literacy. Cognitive abilities pertaining to Internet usage were discussed in section 2.2.7. In this study, cognitive factors pertaining to effective use of the Web for information seeking are collectively referred to as perceived information source accessibility (cognitive access).
One empirical study of gender differences in Internet access and use conducted in the late 1990s by Bimber (2000) demonstrated that several factors account for these differences. Noting that many surveys in the United States reported that somewhat fewer women than men use the Internet, and men are more intensive users of the Internet, Bimber (2000) used regression analysis of survey data collected over several years, 1996, 1998, and 1999, through nationwide, random-digit-dialing of household telephone numbers in the United States, to comprehensively investigate this gender gap. He identified two gender gaps: the Internet access gap and the Internet use gap. Socioeconomic differences between men and women in American society, in terms of gender inequalities across education, income, and employment status in the United States evident in the late 1990s, accounted almost entirely for the gender gap in Internet access. Age was also found to be a significant predictor of Internet access; youth accessed the Internet more than other age groups. Marital status was weakly predictive; married people were more likely to have Internet access. However, the Internet use gap was found to be more related to gender itself than socioeconomic differences between the sexes. More specifically, Bimber observed that men were more likely to be frequent (daily) users of the Internet than women (13% difference), while women were more likely to be moderate (at least once a week) users of the Internet than men. Also, education, race, ethnicity, and employment status were identified as predictors of frequent Internet use. Being White and well-educated were associated with frequent Internet use for both sexes, while full-time employment was associated with frequent Internet use for men only. Bimber noted that these gender differences in intensity of Internet use parallel earlier findings of gender differences in use of other media, such as newspapers, talk radio, and MTV. Overall, Bimber’s empirical study of gender differences in Internet use (2000) revealed the influence of several demographic factors on frequency of Internet use, apart from gender, namely, race, age, education, and employment status, and interactions between these variables.
Several innovative training programs were initiated in the 1990s to address gender differences in computing/information technology. Balka (1997) mentions the Government of British Columbia ‘train the trainer’ approach to computer literacy. Group representatives received computer training from the government and then trained others in their group. In the United States, the National Library of Medicine, in collaboration with the National Heart, Lung, and Blood Institute, the Office of Research on Women’s Health, the Health Care Financing Administration, and the Office of Disease Prevention and Health Promotion, ran a ‘train the trainer’ style program. The purpose of this type of program was to train librarians and representatives from senior centres and subsidized housing how to teach seniors to access health information on the Internet (National Women’s Health Information Center, 1997). Since most seniors are women because women outlive men, training programs directed at seniors will benefit elderly women.

Also of interest is the role of women’s Internet groups, such as Webgrrls, Digital Eve, and the Wired Woman Society, in providing free or low-cost training to their members and to women’s community organizations. For example, the Toronto chapter of Webgrrls conducted Internet training outreach programs, such as Mother-Daughter Internet Clinics (Toronto Webgrrls, 1999). The Plugged-In! Program is another example of a gender-specific computer/Internet training and mentoring program. This training program was organized by the Mid-Continent Council of Girl Scouts and Ottawa University and supported by the National Science Foundation (Mid-Continent Council of Girl Scouts, 1998-99). The corporate sector also provided mentoring programs for girls and women. One example was IBM Canada’s half-day workshops on computer technology for young girls,
which were run by female IBM staff. By 2000, this program had four thousand participants. These workshops were designed to give girls an understanding of high-tech career opportunities and change their perceptions that these jobs are only suited for men. The aim was to increase the numbers of girls enrolling in university-level computer and technology programs and pursuing careers in this field (Church, 2000).

In this study, both attributes of information source accessibility, physical and cognitive access, are considered important information source characteristics that individually influence intensity of seeking health information on the Web. These attributes or dimensions of information source accessibility are similar to Kling’s concepts of technical access and social access (1998). Web users’ perceptions of both their ability to access the Web in terms of perception of costs associated with access, and their ability to retrieve online health information and understand the content, are predicted to exert a positive influence on the dependent variable, frequency of using the Web to find health information on the Web, FSHIW. Those Web users who perceive physical access to the Web as free of barriers, in terms of cost and connectivity, will use the Web to find health information more intensively than those who experience physical barriers to Web use. Similarly, Web users who experience barriers when retrieving health information from the Web and understanding the content of online health information will be less inclined to use the Web for that purpose.

2.4.4.3 Findings on women’s use of health information sources

Findings from the field of health and medicine have come primarily from studies on information for patients and caregivers, and their use of consumer health information services. Hsai (1987) found that family and friends serve as information sources for health issues among Mexican-Americans. Cameron et al. (1994) found that hospital patients prefer verbal information to written information. Women prefer interpersonal and authoritative sources
to mass media sources for factual cancer information (Johnson & Meischke, 1991a, 1991b, 1994). However, doctors underestimate their female patients’ desire for information. Doctors are most likely to discuss objective medical information, such as type of treatment, and least likely to discuss how patients can handle the condition and other matters of personal relevance (Ong, DeHaes, Hoos, and Lammes, 1995, p. 904; Ong and Austoker, 1994; Ong, 1996; Gray, 1997).

In general, consumers have expressed concern about inadequate access to health information (Phillips and Zorn, 1994).

Women display differential preferences for mass media sources. Mass media are identified as the least preferred sources (Johnson and Meischke, 1994) for health information. However, the general public is most likely to obtain information on cancer from the media (Freimuth, Stein, and Kean, 1989; Johnson and Mesichke, 1991a). Chatman (1992) found that elderly women in a senior’s residence preferred the television as an information source, including health information. Johnson and Meischke (1994) reported women prefer television to magazines and newspapers for factual information on cancer and turned to magazines for information on coping with cancer. However, the ranking of source preferences differs across studies. In general, magazines are rated highly for all types of cancer information while newspapers are the least preferred sources for cancer information. In terms of usage, Freimuth et al. (1989) found that the most commonly accessed sources of information on cancer prevention were magazines, newspapers, and television. Connell and Crawford (1988) reported print media were the most highly used source of health information, followed by television, social networks, radio and organizations.

Print-based media seem to play a greater role in the dissemination of health promotion information than television. This may be due to the fact that print-based media can allocate more space to less “newsworthy” items, whereas television shows are under more pressure to deliver dramatic content. Magazines, in particular, are able to provide in-depth coverage of
health issues because they have a narrower focus than newspapers or television. Women’s magazines tend to feature health topics (Freimuth, Stein and Kean, 1989, p. 20; Johnson, 1997, p. 9). Women are more likely than men to use magazines to obtain factual and affective health information. As well, women regard magazines as a critical base of information against which to evaluate subsequently received health information (Johnson, 1997, p. 9). Pamphlets are a popular format for presenting health information because they are readily available, easy to read and portable (LaRocco, 1991, p. 75; Perry and Kirkpatrick, 1991, p. 87; Michaels, 1991, p. 192; Marshall et al. 1991, p. 40).

The finding that popularity (as measured by usage) is not reflective of the quality of the print information sources may hold true for health websites as well. In a study of health websites on urinary incontinence, Sandvik (1999) investigated 75 websites on this topic and grouped them into three categories according to authorship: professionals – universities, hospitals, and clinics; organizations – societies, foundations, and journals, and commercial. He then scored these websites according to quality criteria, partly based on the HONcode, such as ownership, authorship, source, currency, interactivity, navigability, and balance. To determine whether Web users could locate the websites he had rated as most informative, Sandvik conducted a search on “urinary incontinence” using several general-purpose and medically-oriented Web search engines. As well, he determined the popularity of these websites by measuring the number of links to the main incontinence page of each website using HotBot. He also determined the number of links to all pages of each website, divided by the number of webpages in each site, using AltaVista. Sandvik found that information on authorship, source and currency were frequently missing on websites and commercial sites were most likely to lack balance. The most informative website identified in Sandvik’s study was Access to Continence Care & Treatment by Diane Newman. However, this website was not the most frequently linked to website. In fact, none of the medical index sites included this website in their list. Websites created by organizations were much more popular than those developed by professionals, with commercial websites ranked in between in terms of popularity.
2.5 Chapter summary

The literature review on theories and models of information seeking behaviour and research on factors affecting this help-seeking behaviour as it pertains to the health domain, suggest that intensity of health information seeking on the Web is influenced by several factors: health information need with respect to uncertainty associated with personal health conditions; family caregiving; Web self-efficacy, and two sets of information source characteristics, information source quality, in terms of relevance and reliability, and information source accessibility, in terms of physical access to the Web and cognitive access, defined as the user’s perception of their ability to retrieve health information from the Web and understand its content. Theories of information seeking behaviour include mention of socio-demographic variables without specifying these variables individually, while both the health sciences and social sciences disciplines commonly study this group of variables, hence, their inclusion in this study.

The next chapter presents the methodology of the dissertation. The conceptual framework of the study, the hypotheses to be tested and the research design are described.
Chapter 3

METHODOLOGY

3.1 Chapter overview

This chapter of the dissertation describes the methodology of the study. A conceptual framework that relates information source characteristics and situational factors to the intensity (frequency) of seeking health information on the Web by women is presented. The research hypotheses, the definition and measurement of the variables, the study population, and the data collection methods are described.

3.2 Conceptual framework and study variables

This section presents the conceptual framework for examining the role of four widely studied information source characteristics and two situational factors that are pertinent to the use of the Web to find health information. The conceptual framework is based on established theories of information seeking behaviour and published research on information source characteristics from the field of library and information science. The situational factors, health information needs and family caregiving, respectively, have been studied by several academic disciplines, including health and medical sciences, social sciences (psychology, sociology, women's studies), and to a lesser extent, library and information science. Self-efficacy is an established psychological construct that has received considerable attention in recent years in the field of computer science as an important determinant of technology use.

The conceptual framework is presented in Figure 3.1 on the next page. It details the relationships between the dependent variable, intensity (frequency) of seeking health information on the Web (FSHW), and each of the independent variables: health information need, family caregiving,
Web self-efficacy, two attributes of perceived information source quality, relevance and reliability, and two attributes of perceived information source accessibility, physical access and cognitive access. The study variables are grouped as follows: information source characteristics (information source quality and information source accessibility) are placed above the dependent variable, frequency of seeking health information on the Web (FSHIW), while personal characteristics (health information need, family caregiving, Web self-efficacy) are placed below the dependent variable, FSHIW. Although socio-demographic variables were not formally included in the conceptual framework, data on these types of variables was collected and analyzed. This set of variables is placed to the left of the dependent variable, in proximity to both the information source characteristics set of variables and the personal characteristics set of variables. Figure 3.1 illustrates direct relationships between each independent variable and the dependent variable, FSHIW.

**Figure 3.1:** Conceptual framework of health information-seeking behaviour on the Web
Users of consumer health information services and consumer health websites frequently categorize health information needs according to health topic. This behaviour lends support to the finding by Davison et al. (1982) that salience of information needs is associated with amount of information seeking. From the information science literature, information seeking is initiated when knowledge is found to be insufficient and uncertainty is experienced. Information seeking should lead to a reduction in uncertainty (Kuhlthau, 1989; Wilson, 1981, 1997). Thus, amount of uncertainty associated with a health condition is predicted to drive the relationship between health information needs and health information-seeking behaviour.

Women are the health guardians of society. Because of their socially embedded role as family caregivers, women, in particular, middle-aged women, are likely to be involved in health information seeking on behalf of those they provide care to, such as children or aging parents (Allen, 1996; Hoffman & Mitchell, 1998; Dautzenberg, Diederiks, Philipsen, and Stevens, 1998; Guberman, 1999; Paoletti, 1999; Moen, Robison and Fields, 1994; Rutman, 1996). Because of their knowledge of health and illness and the health literature, and their familiarity with the healthcare sector, women often act as gatekeepers by providing health information to others (Metoyer-Duran, 1993). The provision of health information to care recipients is an important aspect of family caregiving.

However, it is not known whether there is a linear relationship between amount of caregiving (in terms of number of dependents and caregiving responsibilities associated with each dependent) and the amount of health information seeking undertaken on the Web. It is predicted that women who are family caregivers engage in health information seeking more frequently than women who are not family caregivers. It is known that health information seeking declines when care recipients have a stigmatizing illness (Main, Gerace, and Camilleri, 1993; Sontag and Schact, 1994; Sonuga-Barke, Thompson, and Balding, 1993). In these situations, blunting occurs.
**Web self-efficacy** is a particular type of self-efficacy pertaining to the individual’s perceptions of her ability to use the Web to accomplish a specific task. In their study of computer self-efficacy, Compeau and Higgins (1995) found that this variable had a significant influence on individuals’ expectations of the outcomes of using computers, their emotional reactions to computers, and most importantly, their actual computer use. Research on Internet users in academia indicates the relationship between *perceived Internet expertise*, one’s confidence in using the Internet, and intensity of Internet usage is significant (Kaminer, 1997; Abels, Liebscher and Denman, 1996). In contrast, the relationship between *perceived Internet expertise* and Internet experience (length of time using the Internet) is not significant (Kaminer, 1997).

The women's studies literature describes a negative environment with respect to women’s experiences with computer studies (Spender, 1995; Gerver, 1986; Margolis, 2002) and social interaction with men in listservs (Morahin-Martin, 1997). Because the computer and Internet environment is masculinised, and women’s enrollment in the field of computer science is low, women may be expected to have low Web self-efficacy. However, Internet demographic studies conducted in the 1990s reveal a large increase in the number of women on the Web (Wootton, 1997; Kehoe, Pitkow, Sutton, Aggrawal, and Rogers, 1999), suggesting that Web technology does not present significant barriers to use by women. In this study, it is predicted that women with high Web self-efficacy will use the Web more frequently to find health information online.

Perceptions of information source quality and information source accessibility drive information seeking (MacMullin and Taylor, 1984). Two attributes of information source quality, relevance and reliability, and two attributes of information source accessibility, physical access and cognitive access, are frequently studied information source characteristics.
**Relevance** is a key dimension of perceived source quality (O'Reilly, 1982). According to Eisenberg and Schamber (1988, p. 166), "Relevance is a measure of utility existing between a document and a question as judged by a requester". In recent years, the subjective view of relevance, user relevance, has taken precedence over system relevance. Relevance is seen as the relationship between information and search query that is constructed or determined by the user. It is cognitive, situational, and dynamic in nature. This type of relevance is referred to as pertinence because it addresses personal cognitive and affective needs, as well as the specific situation in which the information need has arisen. Topical relevance is no longer regarded as sufficient (Park, 1993, 1994; Schamber, Eisenberg, and Nilan, 1990). This shift in relevance research supports the focus on situations in the sense-making theory of information seeking behaviour (Dervin, 1983).

**Reliability**, also referred to as technical quality, is a multidimensional construct. Taylor (1986) defines reliability as "the trust a user has in the consistency of quality performance of the system and its outputs over time." Accuracy, currency, and comprehensiveness, are recognized attributes of reliability. Authoritativeness, expertise, and trustworthiness, were the most frequently reported attributes of reliability by participants in several studies on source evaluation criteria and information seeking conducted by Nilan and colleagues (Nilan, Peek and Snyder 1988; Halpern and Nilan 1988).

A national study on environmental scanning by CEOs in the Canadian telecommunications industry (Choo, 1993) revealed perceived quality of an information source (measured both in terms of its reliability and relevance) was a more important predictor of information source use than perceived information source accessibility. The change in emphasis from information source accessibility to information source quality was attributed to the CEOs’ strong motivation and interest in making sense of a highly complex business environment.
**Perceived information source accessibility** is a multi-dimensional construct. Culnan (1985, p. 302) defines perceived accessibility as the “expected level of effort required to use a particular information source” and identifies three dimensions of accessibility: physical access, gaining physical access to the information source; interface access; translating an information need or request into a language that is understood by the source, and informational access, being able to physically retrieve the potentially relevant information (informational dimension). As previously mentioned, Kling (1998) referred to physical access to technology as technical access, and the technical skills and professional knowledge required to effective utilize technology as social access. Kling’s conceptualization of technical access is comparable to Culnan’s dimension of physical access and his conceptualization of social access is comparable to Culnan’s dimensions of interface access and informational access.

Studies on women’s use of information sources for health information have shown that although high quality sources are preferred, in particular, interpersonal sources, highly accessible sources are more frequently used (Johnson and Meischke, 1991a, 1991b, 1994; Freimuth, Stein, and Kean, 1989; Chatman, 1992). The preference for accessible sources of information is predicted by Zipf’s principle of least effort (1949), information foraging theory (Sandstrom, 1994), and diffusion of innovations research (Rogers, 1995).

**Information use** is final stage of information seeking. Information use should effect a change in the individual’s state of knowledge and capacity to act in an effective manner, for example, solving a problem. It is influenced by several factors, among them, cognitive styles, affective preferences, information processing heuristics, personality type, and routines (Bryce 1996). Taylor (1991) identified eight overlapping categories of information source use: problem understanding (understanding a particular problem); enlightenment (making sense
of a situation); instrumental (instructions, instrumental information); factual information; confirmational (verifying another piece of information); projective (predicting future events); motivational (initiating personal involvement for the purpose of progressing on a course of action); and personal or political (information is used to improve reputation, status, fulfillment, and to develop relationships). According to Dervin (1983b, p. 62), this kind of information use is associated with the following goals: “Got control,” “Got out of a bad situation,” and “Got connected to others.”

3.3 Research hypotheses

The five research hypotheses describe the direction of the relationship between the dependent variable, intensity (frequency) of seeking health information on the Web (FSHIW), and the independent variables, health information need, family caregiving, Web self-efficacy, two attributes of perceived information source quality, relevance and reliability, and two attributes of perceived information source accessibility, physical access and cognitive access. These hypotheses are detailed in the following pages.

**Health information need**

Health information needs are the first stage in theories of health information behaviour. Uncertainty gives rise to information needs and information seeking results in the reduction of uncertainty. Health information needs are thought to be associated with health conditions. The amount of health information seeking undertaken is, in turn, is predicted to be related to the amount of uncertainty associated with each health condition.

The following research hypothesis is proposed:

H1. *Amount of uncertainty* associated with **health information need** is positively correlated with the intensity of health information seeking on the Web.
**Family caregiving**

Women are society's health guardians. They have primary responsibility for the health status of family members. In order to perform this function, health information seeking related to the health conditions of care recipients may be undertaken.

This suggests the following research hypothesis:

H2. **Family caregiving** is positively correlated with **intensity** of health information seeking on the Web.

**Web Self-Efficacy**

Web self-efficacy is predicted to have a measurable effect on intensity of information seeking on the Web, based on the importance of this variable in studies of academic Internet use (Kaminer, 1997; Abels, Liebscher and Denman, 1996), and research conducted on women's experiences with computer education (Spender, 1995; Gerver, 1986) and Internet listservs (Morahin-Martin, 1997).

This suggests the following research hypothesis:

H3. **Web self-efficacy** is positively correlated with the **intensity** of health information seeking on the Web.

**Web Characteristics**

For the study of women seeking health information on the Web, two source-related variables should be considered: **perceived information source quality** and **perceived information source accessibility**. Neither variable has been comprehensively studied with respect to women's use of sources for health information; instead research has focused on examining source preferences and uses without due consideration of source characteristics. In general, studies indicate that
perceived information source accessibility is more important than perceived information source quality: while women express a preference for information sources of high quality, they commonly use information sources that are readily accessible.

This suggests the following research hypotheses:

H4. The perceived quality of Web-based information sources is positively correlated with the intensity of their use in health information seeking.

H5. The perceived accessibility of Web-based information sources is positively correlated with the intensity of their use in health information seeking.

3.4 Definition and Measurement of Variables

3.4.1 Independent variables

Seven independent variables were examined in this study: health information need, family caregiving, Web self-efficacy, perceived information source quality (relevance), perceived information source quality (reliability), perceived information source accessibility (physical access) and perceived information source accessibility (cognitive access).

The measurement of these study variables is detailed below.

3.4.1.1 Health information need

Any discussion of measurement of information needs proceeds from a consideration of uncertainty since uncertainty reduction is seen as the driving force behind the development of information needs. Indeed, uncertainty and information are two concepts that stand side-by-side in Shannon’s mathematical theory of communication, an entropy model that measures uncertainty and information, such that the reduction of uncertainty by a certain amount indicates the gain of an equal amount of information (Shannon, 1948; Shannon & Weaver, 1949). Thus, uncertainty can serve as a proxy for the measurement
of information need. Whittemore and Yovits (1973) identified six types of uncertainty for their generalized information systems model. Consistent with their definition of information as data of value in decision-making, they emphasized one type of uncertainty, executional uncertainty, which they defined as uncertainty associated with execution of various alternatives. (p. 225). According to Klir and Folger (1988), there are two different forms of uncertainty, vagueness, defined as the difficulty of making sharp distinctions in the world, and ambiguity, associated with situations in which the choice between two or more alternatives are left unspecified. Meghabghab and Bilal (1991) have used these two forms of uncertainty to mathematically derive a measure of the information content of reference queries.

While there is an abundance of research on conceptualizing uncertainty for the development of information models, there are few general measures of uncertainty for information-seeking behaviour. Cole, Cantero and Sauve (1998) reviewed Kuhlthau’s “affective” measure of uncertainty, which they felt had predictive value but was insufficient as a measurement tool. Kuhlthau’s measure of uncertainty (1990) consisted of asking subjects about their affective uncertainty with respect to their term paper, in terms of how uncertain they felt, how confused they felt, their feeling of doubt or their confidence level, at three different times during the study period. Cole, Cantero and Sauve (1998) also suggest Kuhlthau’s uncertainty principle contains a second type of uncertainty, related to Shannon’s uncertainty concept, which they term “cognitive uncertainty”.

More recently, Wilson, Ellis and Ford (2000a) adopted Kuhlthau’s model and uncertainty principle in a study of uncertainty in information seeking, arguing that uncertainty is a more important concept to measure for information behaviour than the traditional measure of choice-relevance. The measure of uncertainty used in their study (Wilson, Ellis and Ford, 2000b) is a
general measure of uncertainty wherein the subject indicates their level of uncertainty by placing a mark on the scale with endpoints "very uncertain" and "very certain".

In this study, health information needs were identified by study participants by listing up to five personal health conditions and ranking the uncertainty associated with each health condition on a scale of 0-3. This scale is conceptually similar to the one developed by Wilson, except that the endpoints were identified. This indirect and subjective measure of health information need is an ordinal variable.

The questionnaire items pertaining to health information needs are presented in Part D - Health concerns and information needs (http://www.fis.utoronto.ca/phd/marton/WomensHealth/quesD.html) as follows:

D1 Over the past three months, what health concerns have you experienced, pertaining to your own health status that led you to look for health information. Please list in the space provided each health condition you have personally experienced that led to information seeking. For each personal health condition that led to information seeking, please rate the amount of uncertainty you experienced when the health information need arose by clicking on the circle representing the option that best describes how you feel. Uncertainty is defined as the inability to decide what to do with respect to your health concern(s) due to the lack of information.

Questionnaire respondents were asked to identify the names of up to five health conditions as well as to rank their self-assessed level of uncertainty (0-no uncertainty; 1-some uncertainty; 2-a lot of uncertainty, and 3-extreme uncertainty).
Item D2 is very similar to D1. It focuses on health information needs pertaining to family caregiving.

D2 Over the past three months, what health concerns have those you care for as a family caregiver experienced that led you to look for health information? Please list in the space provided each health condition your caregiving recipient has experienced that led to information seeking. If you are caring for more than one family member, choose the individual for whom you are providing the most care. For each personal health condition that led to information seeking, please rate the amount of uncertainty you experienced when the health information need arose by clicking on the circle representing the option that best describes how you feel. Uncertainty is defined as the inability to decide what to do with respect to the health concern(s) of your caregiving recipient due to the lack of information.

Quantitative data collected from completed questionnaires are contextualized by interview data, which will probe participants about their responses to questionnaire items.

3.4.1.2 Family caregiving

There is an extensive literature on measures of caregiver burden, also referred to as caregiver stress, or strain, which have been developed in many countries over the past forty years. Generally, a distinction is made between objective burden, which pertains to disruption of family life, and subjective burden, the caregiver response to the situation (Vitaliano, Young and Russo, 1991, p. 67; Baronet, 1999, pp. 819-820; Vrabec, 1997, p. 384). Many, if not all, of these measures were developed for specific caregiving situations, predominantly those involving adult children providing informal caregiving to elderly family members suffering from dementia, mental illness, or terminal illness. Consequently, reviews of caregiver burden measures, retrieved from a search of “caregiver burden” in PsycLit, Sociological Abstracts and MEDLINE journal literature databases, tend to specifically address the issues surrounding the use of these measures in research on a
specific caregiver population and care recipient population. For example, Vitaliano, Young and Russo (1991) provide a review of ten measures of burden that have been used with caregivers of individuals with dementia. Similarly, Schene, Tessler and Gamache (1994) review twenty-one instruments that have been used with caregivers of individuals with severe mental illness. Roach (1998) reviews nine instruments of caregiver burden for the purpose of making recommendations as to which measure to include in a toolkit to measure end of life, developed by the Center to Improve Care of the Dying at Brown University.

Review articles examine the number of items in these survey instruments; whether they are self-report questionnaires or interviews; whether they include both objective and subjective measures of burden, and the reliability and validity of the measures. The authors of review articles point out that caregiver burden is a multidimensional concept and different instruments tap different dimensions of this construct. Furthermore, these instruments have been developed for specific caregiver and care recipient populations and are probably not generalizable to all caregiving situations. In other words, there is no one standard measure of caregiver burden. Lawton, Kleban, Moss, Robine and Blicksman (1989) have conceptualized caregiver burden more broadly as caregiver appraisal, in agreement with the stress model developed by Lazarus and Folkman (1984). Their Caregiver Appraisal Measure includes items on the potentially positive dimensions of caregiving experiences, in addition to measures of burden.

Email communication with researchers subscribed to women’s health and methodology listservs provided insight into the problems of measuring caregiver burden. Dorazio-Migliore, a post-doctoral fellow at the Centre for Women’s Studies and Gender Relations at the University of British Columbia who completed her doctorate on a qualitative study of informal
caregiving, objected to the idea that caregiver burden can be easily measured by a list of
criteria and argued instead that it is an extremely complex concept, “composed of an
entanglement of positive and negative emotions, activities, and so on.” (M. Dorazio-Migliore,
personal communication, Tuesday, June 6, 2000). Peters-Davis, Chair of the Department of
Sociology and Anthropology at Beaver College and researcher with the Philadelphia
Geriatric Center found that “contrary to most notions of measurement, the single item
measure "How burdened do you feel?" or something similar was quite valid.”
(N. D. Peters-Davis, personal communication, Tuesday, June 6, 2000). Similarly, in their
study of the psychometric properties of the Caregiver Reaction Assessment measure, a
24-item scale comprising five subscales (self-esteem, disrupted schedule, lack of family support,
financial problems, and health problems), Nijboer and colleagues (1999) mentioned their
use of a global measure of burden, which they referred to as overall burden.
Overall burden was operationalized as a one-item self-composed question about the
participant’s own perception of caregiver burden, with a five-point Likert scale, ranging from
‘no burden at all’ to ‘extremely burdened’.

In this study, it was anticipated that women seeking health information on the Web
conceivably act as primary informal caregivers for one or more types of care recipient
populations (young children, aging parents or relatives, spouse), in terms of the recipient’s
health condition(s) and relationship to the caregiver. Thus, a global measure of caregiving
that can be applied to all caregiver situations is highly desirable.

Caregiver role can be measured objectively by asking participants to identify whether they
are currently providing care to dependants and for how many individuals. This basic
measure of caregiving is simply caregiver status. Questionnaire items pertaining to
caregiver role and experience are presented in Part E – Taking care of family members -
(http://www.fis.utoronto.ca/phd/marton/WomensHealth/quesE.html), as follows:

E1  Do you currently provide care to one or more family members?  
Yes  No
If yes, please continue to question E2 below.
If no, please scroll to the bottom of this page and click the SUBMIT button to continue to
Part F.

E2  Please select ALL individuals for whom you provide caregiving, according to their 
relationship with you.
child under 1  child 1-5  child 6-10  child 11-15  child 16-20  child over 20  spouse/partner
parent-mother
parent-father
sibling-sister  sibling-brother
Other (please specify)

Caregiver role = Total number of care recipients

A note of caution is in order: this objective measure assumes that caregiving responsibilities 
are the same, irrespective of the type of caregiver recipient and his/her health condition(s).

A subjective measure asks participants to rank the difficulty of caregiving for their primary 
caregiving recipient. Here, an abbreviated version of the 24-item Caregiver Reaction 
Assessment Instrument developed by Charles W. Given and Barbara A. Given and 
colleagues (1992) is used, with the permission of the primary author, as follows:

E3.  Perceptions of caregiver situation and responsibilities.

Please select the most appropriate choice for each statement that best describes 
how you feel.

a.  I feel privileged to care for my care recipient.
b.  My financial resources are adequate to pay for things that are required for caregiving.
c.  It is very difficult to get help from my family in taking care of my care recipient.
d.  I have to stop in the middle of my work or activities to provide care.
e. I really want to care for my care recipient.

f. I have eliminated things from my schedule since caring for my care recipient.

g. I have enough physical strength to care for my care recipient.

h. Since caring for my care recipient, I feel my family has abandoned me.

i. I am healthy enough to care for my care recipient.

j. Caring for my care recipient puts a financial strain on me.

k. I enjoy caring for my care recipient.

l. Since caring for my care recipient, it seems like I'm tired all of the time.

The Likert options for E3 are Strongly disagree (1); Disagree (2); Neither agree nor disagree (3); Agree (4), and Strongly Agree (5). 

This quantitative, ordinal, measure was contextualized by a qualitative perspective on caregiving derived from the interview survey. Interview 1 – Health status and Caregiving Responsibilities – examined caregiver responsibilities, as follows: 

Q2) Are you at present providing unpaid care to members of your family, including partner/spouse, children, aging parents, or siblings? If not, have you done this in the past year? (If affirmative to either question, continue. Otherwise, terminate interview) If yes to either question, could you please describe, in general terms, your caregiving responsibilities?

Participant response should answer the following questions: (if not, ask these questions)

- For whom do you providing caregiving (child/spouse/sibling/parent)
- What caregiving activities do you provide?
- For how long have you providing caregiving?
- What health condition(s) does your caregiving recipient have?
- For how long has your caregiving dependent had this health condition?
- Do you experience caregiving as empowering or disempowering, and why? Alternatively, what aspects of caregiving do you find empowering? Disempowering? (Adapted from Rutman, 1996)
3.4.1.3 Web self-efficacy

The measurement of self-efficacy is complex: one can measure general self-efficacy or self-efficacy associated with the use of specific technologies, or with performing specific behaviours, such as adherence to a physical fitness regimen. There is some debate as to whether one should measure both general self-efficacy and domain-specific self-efficacy, such as Web self-efficacy, or simply domain-specific self-efficacy. Bandura (1986) suggested the use of domain-specific self-efficacy measures.

<table>
<thead>
<tr>
<th>Computer Self-Efficacy Measure</th>
<th>Not at all confident</th>
<th>Moderately confident</th>
<th>Confident</th>
<th>Totally confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>I could complete the job using the software package:</td>
<td>YES…1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1. ..if there was no one around to tell me what to do as I go</td>
<td>YES…1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. ..if I had never used a package like it before</td>
<td>YES…1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. ..if I had only the software manuals for reference.</td>
<td>YES…1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. ..if I had seen someone else using it before trying it myself</td>
<td>YES…1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. ..if I could call someone for help if I got stuck.</td>
<td>YES…1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. ..if someone else had helped me get started.</td>
<td>YES…1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. ..if I had a lot of time to complete the job for which the software was provided</td>
<td>YES…1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. ..if I had just the built-in help facility for assistance.</td>
<td>YES…1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. ..if someone showed me how to do it first.</td>
<td>YES…1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. ..if I had used similar packages before this one to do the same job</td>
<td>YES…1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 3.1: Computer self-efficacy measure
(Source: Compeau & Higgins, 1995, p. 210)

Several scales have been developed for computer self-efficacy. Eachus (1999) developed a 47-item scale designed to evaluate users’ beliefs in their abilities to make effective use of computer systems. Preliminary findings on the psychometric properties of the scale reveal high reliability - Cronbach’s alpha of 0.94, and construct validity in terms of relationships between the self-efficacy scores and data measuring computer use.
Self-efficacy score is positively related to previous experience with computers and familiarity with software packages. Similarly, Compeau and Higgins (1995) developed a 10-item measure of computer self-efficacy. Their measure is based on a review of previously existing scales and comprises three dimensions of self-efficacy. It was found to have high reliability, discriminant validity, nomological validity, and construct validity (p. 204). This scale is reproduced below in Table 3.1 on the previous page.

Here, a Web-based self-efficacy measure is presented, based on the computer self-efficacy scale developed by Compeau and Higgins (1995). Several items have been removed from the original scale to reduce redundancy. Specifically items 1&5, 2&10, and 6&9 were felt to be similar to each other, justifying the removal of one from each pair. As well, the Likert scale has been reduced from ten levels to five, to be consistent with other measures in this study and reduce participant confusion. This measure is presented in Part A of the Web questionnaire (http://www.fis.utoronto.ca/phd/marton/WomensHealth/quesA.html, A7).

A7. I can use a NEW Web browser to find information on the Web:

Please select the most appropriate choice for each statement by clicking on the circle that best indicates your response.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all Confident</th>
<th>Moderately Confident</th>
<th>Completely Confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ...if I had never used any kind of Web browser before.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. ...if I had seen someone else using it before trying it myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. ...if someone had offered me assistance in getting started.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. ...if someone offers me assistance when I have a problem.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e. ...if I had just the built-in help facility for assistance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>f. ...if I had a lot of time to figure out how to use it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 3.2: Web-based information-seeking self-efficacy measure
Item A7 examines personal perceptions of ability to effectively use the Web to find information. Web self efficacy is one of the independent variables in this study. Six statements are provided and participants are required to select the most appropriate choice on a Likert scale of 1 (not at all confident) to 5 (completely confident) for each statement. Post study, an interval variable was derived from item A7 as the average of all ordinal scores for A7 statements (A7EffAve).

To distinguish between Web self efficacy statements that pertain to learning to use a new Web browser without human assistance, compared to statements that cover learning to use a new Web browser with human assistance, two interval variables were created. Factor analysis with principal component analysis of these six statements supports their classification into two groups, although there is a certain amount of overlap between items in factors 1 and 2. A post-study interval variable was devised which represents the average of the ordinal scores for statements a, e, and f (learning to use a new Web browser on one’s own) (WebNPAv). As well, a post-study interval variable was devised which represents the average of the ordinal scores for statements b, c, and d (learning to use a new Web browser with human assistance) (WebFPAV).

3.4.1.4 Web characteristics

Measures for this set of study variables were obtained from the study of organizational Web use conducted by Choo, Detlor, and Turnbull (2000).

3.4.1.4.1 Perceived information source quality

Based on a review of the literature, as summarized by Choo (1993) two dimensions of perceived source quality have been identified: relevance and reliability. In the current study, the definition of relevance of information from a source as information that is needed
and useful with respect to goals and activities (p. 87) is adopted. This definition of relevance incorporates the construct, utility (usefulness), identified in studies of Internet adoption and use by academics (Abels, Liebscher, and Denman, 1996; Liebscher, Abels, and Denman, 1997; Kaminer, 1997) and the adoption and implementation of online information technology by health professionals (Marshall, 1987) as an important variable to study. This definition also incorporates the *compatibility with needs* dimension of compatibility, one of the five characteristics of innovations (Marshall, 1987). Another dimension of relevance is currency (when was information last updated).

**Reliability** of information from a source is defined as information that is authoritative and dependable, that is personally trusted (Nilan, Peek and Synder, 1988; Halpern and Nilan, 1988; Taylor, 1986, p. 64; Choo, 1993, p. 87). According to guidelines established for evaluating the quality of health information on the Web, evidence (are claims supported); security (privacy and confidentiality of using source to obtain information) and advertising (presence/absence of), are also attributes of reliability (Ambre, Guard, Perveiler, Renner, and Rippen, 1997; The Health on the Net Foundation, 1998).

Respondents are asked to rate *each type of source*, e.g. websites, print, mass media, on each of the two dimensions of source quality, relevance and reliability using a 5-point Likert scale. The ratings on each dimension are summed for each type of Web-based source to provide an overall score on perceived source quality for each type of source.

The questionnaire items pertaining to *perceived source quality* were presented in Part C of the Web survey questionnaire - Perceptions of Web-Based Health Information Sources, (http://www.fis.utoronto.ca/phd/marton/WomensHealth/quesC.html) as follows:
C3. How relevant is the health information obtained from each information source?
   Relevant health information is health information that is needed and useful with respect to your health and/or the health of those you care for. It is often considered to be comprehensive and timely.

   Please select the most appropriate choice for each information source.

   The Likert options for C3 are: Very irrelevant (1); Fairly irrelevant (2); Of some relevance (3); Fairly relevant (4), and Very relevant (5).

C4. How reliable is the health information from each information source?
   Reliable health information is health information that is authoritative (credible) and dependable.
   Reliable health information is information that you personally trust.

   Please select the most appropriate choice for each information source.

   The Likert options for C4 are: Very unreliable (1); Unreliable (2); Somewhat reliable (3); Fairly reliable (4), and Very reliable (5).

3.4.1.4.2 Perceived information source accessibility

Abels, Liebscher, and Denman (1996) investigated four dimensions of source access pertaining to the Internet: proximity (physical distance from Internet connection), workstation availability (is access shared with others), prior experience, and ease of use. Proximity and workstation availability were found to be the strongest measures of perceived accessibility and were correlated with Internet adoption, but not usage. Since participants for this study are women who have Internet access at home and Internet adoption is not a variable in this study, dimensions of access affecting Internet adoption are of modest interest in the operationalization of perceived accessibility.

Based on a review of the literature, Choo (1993, p. 84) identifies two dimensions of perceived source accessibility: time and effort to approach, contact, or locate the source,
and ease of getting desired information from the source. These are fairly broad attributes encompassing more specific dimensions of access such as financial and time costs, physical access and handling the source, which implies cognitive aspects of understanding the information obtained.

Note, none of these attributes are specific to a specific type of Web-based source; they affect all types of Web-related sources – newsgroups, listservs, chatrooms, and websites, as well as non-Web sources, such as print sources and interpersonal communication. For this reason, the two questions on perceived source accessibility found in the questionnaire survey constructed by Choo (1993, pp. 308-309) are adopted for this study.

The questionnaire items pertaining to perceived source accessibility were presented in Part C of the Web survey questionnaire - Perceptions of Web-Based Health Information Sources, (http://www.fis.utoronto.ca/phd/marton/WomensHealth/quesC.html) as follows:

C1. How much of your time and effort is needed to approach, contact, or locate each information source?
   For Web-based sources, time and effort to approach, contact, or locate an information source refers to the time and effort required to access the Web from your computer, e.g. modem dial-up time, and to download a Web-based information source to your screen, e.g. time to load a website.
   Please select the most appropriate choice for each information source.

The Likert options for questionnaire item C1 are: Very little (1); Little (2); Some (3); A lot (4); and A great deal (5).

C2. After contacting or locating the information source, how easy is it to get the desired information from that source?
   For Web-based sources, getting the desired information from a source refers to how ease of navigation (e.g. through hypertext links and search engines) within the source and the readability of the information (quality of text, graphics and design elements) affects your ability to obtain information from that source.
   Please select the most appropriate choice for each information source.
The Likert options for questionnaire item C2 are: Very easy (1); Easy (2); Neither easy nor difficult (3); Difficult (4); and Very difficult (5).

For all four questionnaire items on Web characteristics (C1-C4), different types of information sources are listed, which can be categorized as Web-based, print-based; mass media and interpersonal sources. The types of information sources listed are: websites; web-based bulletin boards or chatrooms; listservs or newsgroups; pamphlets or fact sheets; newspapers or magazines; books; television programs; radio programs; videos; CD-ROMs; family members or friends; librarians, healthcare practitioners (e.g. doctor, nurse, physiotherapist), and other (please specify).

3.4.2 Dependent variable: Intensity of health information seeking on the Web

A quantitative measure of information seeking is integral to the theoretical model for this study. Intensity of health information seeking on the Web is operationalized as a composite variable, the product of these two factors:

1) frequency: number of episodes of health information seeking on the Web in a specified timeframe (NoEP), e.g. one month, and the number of Web-related sources (including websites and CMC sources available through the Web) visited per session;

2) duration: length of each visit to a health website or health-related Web-based CMC source in an information-seeking session.

To calculate the intensity of seeking health information on the Web, the following equation was devised:

\[ \text{WEB INTENSITY} = \text{FreqVisit} \times \text{DurVisit} \]

\[ = (\text{NoSources/Episode} \times \text{NoEpisodes}) \times \text{DurVisit} \]
This objective measure of health information seeking on the Web is based, in part, on Choo’s measure of amount of scanning (1993, p. 87), which in turn was derived from Hambrick’s threefold measure of scanning (1979): interest method, frequency method, and hours method. The interest method, which represents a subjective measure, is not utilized in the present study due to concern with the possibility that this measure will tap other traits, such as monitoring, hypochondria or anxiety.

To measure this variable, four methods of data collection were considered. Triangulation of Web questionnaire data, interview data and history and tracker log data should provide an accurate picture of intensity of health information seeking on the Web. The objective measure is the Web activity files. The WebTracker client-side log file software captures the frequency of episodes by creating data files for each day the Web is used that are stored on the participant’s computer as text files. It captures the duration of each Web session by noting the time of each Web action. The time of the last action minus the time of the first Web action provides the researcher with the total amount of time for each session. Similarly, the Web browser history file dates and time-stamps each Web address (URL) accessed by the study participant. The second interview permits the researcher to ask the participant about the amount of time spent in each Web session, if there was any difficulty ascertaining this from the Web activity logs and files. The Web use journal sheets require participants to note the start and end time of each website visit. The most reliable and easily employed data collection technique for the dependent variable was the Web survey questionnaire. More specifically, items in Part B of the online questionnaire (http://www.fis.utoronto.ca/phd/marton/WomensHealth/quesB.html) asked survey respondents:
B4. On average, how many **hours a week in total** do you spend on the Web looking for health information, using each of the following Web-based information sources?

B5. *During* a typical Web session for health information seeking, how much **time (in hours)** do you spend looking for health information, using each of the following Web-based information sources?

Pre-study, it was anticipated that all four types of data would be used to calculate the dependent variable. *However, in practice, only item B4, a measure of frequency of Web use, was utilized.* The reliance on the survey data is largely due to problems experienced with the WebTracker software during this study, as detailed in Section 5.6 Study participants (p. 234). As well, it was difficult to ascertain from interview transcripts how much time participants spent seeking health information on the Web in each session of Web use because participants often could not recall their Web use sessions with the required degree of accuracy. Furthermore, study participants frequently did not accurately record all of the health websites visited during each session of seeking health information on the Web in their Web use journals because they forgot to do so or because they felt that doing so impeded their natural Web use behaviour and was time consuming.

The dual nature of the Internet (CANARIE, 2001, Crowley, 2002), both as an information source, or collection of information sources, and as a social medium was described earlier in Section 1.2 (pp. 1-3). According to Crowley (2002, p. 474), "There are in effect two Internets today, complementary and parallel: a **content-based Internet** that so far has favoured the free and open distribution of textual, acoustic, and visual materials; and an **interpersonal internet** that is strongly based in messaging activities, among friends, families, affinity groups, and workplace and professional networks." By the late 1990s, the content Internet and the social Internet had migrated to the Web, which served as a flexible and extensible platform for the absorption of previously separate elements of the Internet as it continued to evolve.
Acknowledging this duality, the dependent variable for this study’s survey questionnaire was divided into two facets: intensity of seeking health information on the Web from textual content websites, and intensity of seeking health information on the Web from Web-based computer-mediated communication (CMC). This conceptualization of the Web as an online information source offering access to both factual content and communication channels had previously been adopted in the women in IT study conducted in 2000 (Marton and Choo, 2002), the first empirical study of a model of online information seeking to do so. However, in this study, the CMC facet was further divided based on amount of interactivity. Listservs and newsgroup are, in essence, asynchronous message distribution systems, one narrowcasting and the other broadcasting, respectively. Both offer limited user interactivity (less interactive) than bulletin boards and chatrooms (more interactive). The latter two CMC channels enable the exchange of messages but also offer additional features, such as the ability to edit previous posts, a message archive, online games, emoticons and other graphics, and member profile pages. Chatrooms are the most interactive type of CMC channel because it offers synchronous communication between two individuals or groups. (Krol, 1994; Wallace, 1999; Kim, 2000). Despite grouping these four CMC channels according to amount of interactivity, the study hypotheses did not predict differences in the strengths and significance levels of the relationships between the independent variables and the three facets of the Web.

3.4.3 Other variables

In order to provide a context for this study on Web use, background information about survey respondents included seven demographic variables and several measures of Web experience, was collected from the Web survey questionnaire.
3.4.3.1 Demographic variables

Section F of the Web survey questionnaire covers general demographic characteristics of the study sample. There are seven items in this section concerning age, geographic location, occupation, household income, education, primary language, and marital status. Many of these measures were obtained from the Graphics Visualization and Usability Center (GVU)’s Tenth World Wide Web User Survey (Kehoe, Pitkow, Sutton, Aggarwal, and Rogers, 1999). Racial identity was added to the survey mid-way through the survey timeframe at the suggestion of Professor Mark Winston, then a professor at the School of Communication, Information and Library Studies, Rutgers University, who studies diversity in the workplace. There is also an item concerning how participants found out about the study.

3.4.3.1.1 Age

The questionnaire item on age is a 5-category ordinal variable. Categories are consistent with those in the Statistics Canada 1996 Census of Canada. Post-study, this variable was converted to a dichotomous variable (0=45 and under; 1=46 and over).

3.4.3.1.2 Geographic location

There are two items on geographic location: F2 concerns geographic location within Canada and F3 concerns geographic location outside of Canada. Categories for item F3 are adapted from GVU’s Tenth WWW User Survey.

3.4.3.1.3 Occupation

Item F4 concerns occupation. This nominal variable has many categories that capture many forms of employment, in particular, those in which women predominate, as follows: unemployed/retired; homemaker/housewife/mother; sales; clerical/secretarial/administrative; computer/Internet professional; manager; analyst; writer; librarian or other information professional; educator; researcher; student, not otherwise specified (NOS); student,
undergraduate; student, graduate; student, health science, and health care practitioner. This variable was recoded post-study as a dichotomous variable (0=non health occupation or student; 1=health occupation) to investigate the possibility of influence of domain knowledge on the dependent variable, health information seeking on the Web.

3.4.3.1.4 Household income

Item F5 asked respondents about their annual household income in Canadian dollars. The categories of this ordinal variable are as follows: under $10,000; $10,000-19,000; $20,000-$29,000; $30,000-$39,999; $40,000-$49,999; $50,000-$74,999, and $75,000-$99,999. Categories are consistent with Statistics Canada 1996 Census of Canada and GVU's Tenth WWW User Survey. Post-study, household income was recoded as a dichotomous variable (0=under $40,000; 1=$40,000 and over).

3.4.3.1.5 Education

Item F6 asked respondents to record the highest level of education obtained. This nominal variable captures all levels of education – secondary (high school) and post-secondary (college diploma and university degrees). Categories were adapted from the Educational Attainment item in GVU’s Tenth WWW User Survey. Post-study, this variable was recoded as a dichotomous variable (0=secondary school or college completed; 1=university degree completed).

3.4.3.1.6 Primary language

Item F7 concerns primary language, defined as the language spoken most often. Respondents select one option from the many languages that are represented in the drop-down menu of this nominal variable. This format prevents respondents from selecting multiple options, although clearly, individuals can be fluent in more than one language. Categories were adapted from the Primary Language item in GVU’s Tenth WWW User Survey.
3.4.3.1.7 Marital status

Item F8 concerns current marital status. For this nominal variable, the categories are as follows: single; married; common-law; divorced, and widowed. Categories were adapted from the Marital Status item in GVU’s Tenth WWW User Survey, with the addition of the category, common-law. These categories are consistent (with the addition of common-law) with those listed in the Statistics Canada 1996 Census of Canada. Post-study, this item was recoded as a dichotomous variable (0=alone; 1=together), where the category of alone comprises single, divorced and widowed, and the category of together includes married and common law relationships. Note that this form of measurement does not take into consideration short-term relationships.

3.4.3.1.8 Racial identity

Item F9 concerns racial identity. This nominal variable was added midway in the timeframe of the Web survey, specifically, it was added on February 20, 2001. This accounts in part for the seemingly low response rate. The categories are as follows: Caucasian(European); Caucasian(Hispanic); Caucasian (Middle-East); Asia; South Asian; Black(Caribbean); Black(African); and Aboriginal(N.A.). These categories were adapted from the Race item in GVU’s Tenth WWW User Survey, which is consistent with the classification of racial groups by the U.S. Census Bureau (2009). Post-study, this variable was recoded as a dichotomous variable (0=Non-Caucasian; 1=Caucasian).

3.4.3.2 Internet experience and use

In Section A of this seven-part Web survey questionnaire, there are six items concerning general Web usage and skill level, as well as the item on Web self-efficacy. With the exception of the scalar Web self-efficacy measure, these measures were obtained from the Graphics Visualization and Usability Center (GVU)’s Tenth World Wide Web User Survey (Kehoe, Pitkow, Sutton, Aggarwal, and Rogers, 1999).
3.4.3.2.1 Length of Web usage

Item A1 concerns length of time using the Web. For this ordinal variable, the categories are as follows: less than a year; one to three years; four-6 years; more than seven years. Post study, this ordinal variable was recoded as a dichotomous variable (0=less than four years; 1=more than four years.

3.4.3.2.2 Web Access

Item A2 examines Web access from several locations: (a) home, (b) work, (c) school/college/university, (d) public library, (e) family member/friend, and (f) other. Post-study, an interval variable was calculated as the sum of all options in item A2 (A2AmtAcc). This variable represents total number of Web access locations for each respondent.

3.4.3.2.3 Internet connectivity speed

Item A3 concerns Internet connection speed. There are nine options: options 1-5 represent dial-up or low speed connection speeds while options 6-9 represent ISDN, T1, and cable modem, which are forms of high-speed Internet connectivity. Post-study, this ordinal variable was recoded as a dichotomous variable (0=dial-up modem; 1=ISDN or better).

3.4.3.2.4 Shared home Internet access

Item A4 concerns shared home Internet access. For this dichotomous variable, the options are simply no or yes. Item A5 builds on item A4 by asking with whom Internet access is shared: (a) spouse/partner; (b) children; (c) sister; (d) brother, and (e) others. Post-study, the interval variable A5_SUM was calculated from A5 as the sum of all types of individuals with whom home Internet access is shared.
3.4.3.2.5 Primary uses of the Web

Item A6 examines types of Web uses. The options are: (a) getting information for personal needs; (b) education; (c) shopping/gathering product information; (d) recreation/leisure; (e) work/business, (f) communication with others (including email), and other. Post-study, the interval variable A6_SUM was calculated from A6 as the addition of all options for uses of the Web.

3.5 Study Population

3.5.1 Study Population Characteristics

To participate in this multi-method exploratory study on how women seeking health information on the Web, prospective study participants were required to meet the following criteria:

1. Women of all ages and backgrounds and health experiences (all components of the study)
2. have home access to the Web and live in the Greater Toronto Area (components 2-4);
3. preferably use Netscape 3.0-3.7 or Microsoft Internet Explorer 5.0 Web browser (components 2-4) and have an IBM-compatible PC (components 2-4)
   * (This would exclude women using Macintosh, AMIGA, ATARI, or other OS)
4. Collectively represent a wide range of personal health experiences and family caregiving experiences, although it was not required that participants must be experiencing health problems or that they were currently family caregivers.

While not specified in the study’s publicity material, the term “women” in the first criterion for study participation was defined as biological adult females, otherwise referred to as adults of the female sex. Although the term female gender is frequently employed in many contexts, here it refers solely to females as a sociological construct.
Initially, sampling for this study endeavoured to represent key population demographics of Canadian women at the time of the study, including age, socioeconomic status, ethno-racial composition, occupation, level of education attained, languages spoken and geographic distribution. Religious affiliation was not taken into consideration. However, in practice, this proved to be overly ambitious. The parameters of the sample for this study were developed from a consideration of two demographic variables: age and racial identity. The 1996 Canadian census data on Canadian population demographics was used to determine the proportions required for each group of women according to these two demographic variables.

While the terms race and ethnicity are frequently used interchangeably by government and health institutions, as well as by academic researchers, these terms have distinct meanings. According to Kang (2003, pp. 39-40), “Race is a familiar concept within our culture. Most people understand race as a biological characteristic, inherited from our parents and manifested in physical appearance. Integral to the concept of race is the typology of racial categories. In fact, the way that many people define race is simply to list categories.” Chavez and Guido-DiBrito (1999, p. 40), citing Spikard (1992, p. 14), note that racial identity has a biological dimension that is based on an individual’s physical appearance, genetics, and the qualities of their character. In turn, racial identity has a social dimension, which is based on the biological dimension, such that Europeans grouped others hierarchically with Caucasians at the top, Asians and Aboriginal peoples immediately below them, and Africans at the bottom of this hierarchy. While recognizing the problematic nature of racial classification, they state (p. 40), citing Hearn (1998), “Racial identity seems most often, however, to be a frame in which individuals categorize others, often based on skin color.”

In contrast, Chavez and Guido-DiBrito, citing Yinger (1976), view ethnic identity solely as a social construct, in terms of the individual’s identification with a segment of the
population with whom they share a common origin and elements of a common culture, and with whom they feel a common bond. Individuals of the same ethnic group participate in shared activities that are predicated on a common origin and culture.

In this study, the term racial identity is employed in the survey questionnaire to denote the broad construct of race as it is commonly used in the health sector and health research studies, as well as by the U.S. Census Bureau (2009). To cite but a few examples from the journal literature that illustrate the widespread use of the terms race and ethnicity as distinct constructs, Fong and Gulia (1999) described differences in neighbourhood qualities among racial and ethnic groups in Canada; Gryson (1998) described racial origin and student retention in a Canadian university; Alba and Logan (1991) described racial and ethnic diversity in suburbanization; Devins and Edworthy (2000) studied racial differences in quality-of-life among women with systemic lupus erythematosus; Pei et al. (2000) studied racial differences in survival of patients on dialysis, and Ruggles Gate (1939) examined blood groups and racial classification.

In the field of community-based health in Canada, it is not uncommon to employ the term ethnoracial or ethnic/racial or ethno-racial, to denote ethnicity as a more fine-grained social construct existing within the broader construct of race. It is in this sense that the term ethnoracial identity is employed in the interview component of this study. To illustrate the pervasive use of the term ethnoracial with but a few examples, several Canadian reports are listed here, as follows: *Diversity: ethnoracial issues in home and community care* from the Canadian research network for care in the community (Lum, et al., 2009), *Ethnoracial communities take action against intimate partner violence* from the Centre for Addiction and Mental Health (Roberts, 2008), and *Ethno-racial groups in Toronto, 1971-2001: a demographic and socio-economic profile*, published by York University’s Institute for Social Research (Ornstein, 2006).
As is evident from table 3.3 below, the ethnic origin of Torontonians, Ontarians and Canadians is predominantly British, Canadian, French, and other European Caucasian (Europeans), also commonly referred to as Whites, predominate. However, Toronto has a greater number of individuals of non-European ethnicity than Canada as a whole. *Asians comprise the largest percentage of non-Europeans, or visible minority race.*

From the 1996 census, it is evident that the largest number of recent immigrants to Canada, and to Ontario, specifically, originated from these countries: Hong Kong, the People's Republic of China, India, Philippines, Sri Lanka, Poland and Jamaica. Since Canada derives its population growth primarily from immigration, and immigrants are coming increasingly from Asia, Southeast Asia, and the Caribbean, sampling Canadian citizens from these groups is desirable. Because women from minority groups are unlikely to use formal information services, such as libraries (Harris and Dewdney, 1994), an effort must be made to reach these women through ethnoracial health and community cultural organizations.

<table>
<thead>
<tr>
<th>Ethnic Origin</th>
<th>Canada</th>
<th>Ontario</th>
<th>Toronto</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian</td>
<td>31%</td>
<td>12%</td>
<td>16%</td>
</tr>
<tr>
<td>Aboriginal</td>
<td>2%</td>
<td>.7%</td>
<td>.13%</td>
</tr>
<tr>
<td>British Isles</td>
<td>37%</td>
<td>44%</td>
<td>32%</td>
</tr>
<tr>
<td>French</td>
<td>20%</td>
<td>12.5%</td>
<td>6%</td>
</tr>
<tr>
<td>Other European</td>
<td>13%</td>
<td>18%</td>
<td>24%</td>
</tr>
<tr>
<td>East and southeast Asian</td>
<td>4.4%</td>
<td>5.5%</td>
<td>11.5%</td>
</tr>
<tr>
<td>South Asian</td>
<td>2.5%</td>
<td>3.2%</td>
<td>7%</td>
</tr>
<tr>
<td>Caribbean</td>
<td>1%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>African</td>
<td>.5%</td>
<td>.9%</td>
<td>2%</td>
</tr>
<tr>
<td>Arab origins</td>
<td>.6%</td>
<td>.8%</td>
<td>.9%</td>
</tr>
<tr>
<td>Latin, Central, South American</td>
<td>.4%</td>
<td>.5%</td>
<td>.9%</td>
</tr>
</tbody>
</table>
Table 3.3: Canadian population demographics according to ethnic origin

Adapted from Statistics Canada. Single and multiple ethnic origin responses, 1996 Census

From table 3.4 below, it is apparent that there is agreement between the demographic ratios for age composition for Toronto, Ontario, and Canada. Thus, sampling women living in Toronto should ensure a representative sample of women in Canada, with respect to distribution of age groups.

<table>
<thead>
<tr>
<th>Region</th>
<th>Under 15</th>
<th>15-24</th>
<th>25-44</th>
<th>45-64</th>
<th>65-74</th>
<th>75+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>20%</td>
<td>13%</td>
<td>32%</td>
<td>21%</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>Ontario</td>
<td>20%</td>
<td>13%</td>
<td>32%</td>
<td>21%</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>Toronto</td>
<td>19%</td>
<td>13%</td>
<td>35%</td>
<td>21%</td>
<td>7%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Table 3.4: Percentage of Canadian women according to age group.

Adapted from: Statistics Canada. Population by selected age groups and sex for Canada, provinces and territories and Population by selected age groups and sex for census metropolitan areas, 1996 Census

Obtaining a random sample is ideal for the purpose of ensuring a representative sample, which is the basis for inferential statistics. However, random sampling was not feasible for this study because a comprehensive list of all women in Canada from which to devise a random sample did not exist. Furthermore, probability sampling is not appropriate because selecting the widest variety of participants was desired. In this situation, purposive or judgmental sampling is appropriate because one of the purposes of this form of sampling, as stated by Babbie (1998, p. 195) is "to study a small subset of a larger population in which many members of the subset are easily identified, but the enumeration of all of them would be nearly impossible."
The use of a sampling frame that is geographically restricted to one city is common practice in academic survey research, which has relied on the postal mail distribution of print questionnaires and local publicity to encourage participation. The time and financial costs associated with postal mail distribution have made the nation-wide distribution of print questionnaires prohibitively expensive. With the advent of the Internet, in particular, the Web, online questionnaires can reach a national or international population, and the study can be publicized more widely using the Internet. However, the researcher is still restricted by time and money from interviewing participants residing outside of the city in which the study originates. Therefore, in this study, the majority of study participants were recruited locally from the population of women in Toronto, and to a lesser extent, from outside Toronto.

### 3.5.2 Participant recruitment methods

To derive a sample that represents women of all age groups and ethnoracial identities, prospective study participants were recruited using the following methods of publicity:

**Print formats:** Post flyers at libraries/information centres, health centres and cultural organizations, and streets in downtown Toronto

**Electronic formats:** Post notices to women’s health, women’s Internet organization and health condition-specific listservs, newsgroups, websites
Send email notices to participants from previous health and Web studies conducted by the researcher

Both print and electronic postings directed potential participants to the study website at http://www.fis.utoronto.ca/phd/marton/WomensHealth/. To elaborate, recruitment flyers for this study were posted at several community centres, libraries/information centres, health centres, and cultural organizations in Toronto frequented by these demographic groups. Over-sampling of women representing diversity of race (visible minorities) and age (young and elderly), was deemed desirable, because these segments of the population are poorly represented in consumer health
information studies and surveys of Internet use. However, in practice, recruitment of these subpopulations was not achieved, presumably at least in part because many of these groups were not Web users at the time this study was undertaken, with the exception of young women in their twenties.

Posting to women’s health and health condition-specific listservs and newsgroups, as well as women’s health websites such as Women’s Health Matters, was undertaken, for the purpose of recruiting women who have experience using the Internet and Web to find health information online. An announcement about the study inviting potential participants to visit the study website was posted, as follows:

My name is Christine Marton. I am a doctoral student in the Faculty of Information Studies at the University of Toronto. I am conducting a study on how women look for health information on the World Wide Web. To find out more about this study and how you can participate, please visit the study website at http://www.fis.utoronto.ca/phd/marton/womenshealth/.

This notice is similar to email messages sent to women in IT-related listservs (e.g. Toronto Webgrrls) to recruit participants for a similar Web study, conducted in the summer of 2000, which examined women IT professionals’ use of the Web in the workplace (http://www.fis.utoronto.ca/phd/marton/Webstudy/). The website for the study on women’s health information-seeking on the Web resembles the website the researcher set up for an online questionnaire to evaluate the Women’s Health Matters website. The recruitment webpage and online questionnaire received ethics approval from the University of Toronto, Faculty of Information Studies and University Health Network. Because participants were required to visit the study website before gaining entry to the questionnaire, the number of irrelevant responses was reduced.
As a small incentive, those participating in all aspects of the study received $50 remuneration: $10 for completing the first interview and $20 for completing the second interview, $10 for collection of Web activity logs, and $10 for the Web use journal sheets. These amounts were paid in installments, upon the completion of each part of the study. As well, one participant was selected from the names of those who completed the online questionnaire in its entirety and who wished to participate in a draw for a $100 cash prize draw.

3.5.3 Sample size calculation
The requirements for sample size differ depending on the data collection techniques. Twenty subjects is adequate for conducting face-to-face interviews, collecting journals of Web use and Web activity files (tracker, bookmark, history files) since gaining an “information-rich” sample, not statistical significance, is the goal.

For the questionnaire survey, which was available online as a Web-based questionnaire, a minimum sample size of 66 respondents was required, in order that hypothesis testing through multiple regression analysis of a regression model with one dependent variable and five independent variables has sufficient statistical power (alpha=0.01, power=0.80) according to Cohen and Cohen’s formula for calculating power (1983, p. 117), defined as the probability of rejecting the null hypothesis (1 – beta), and assuming medium effect size. When the seven demographic variables are added to the regression equation, a sample size of 92 respondents is required.

3.5.4 Voluntary consent
The study homepage informed prospective participants that their participation in the study is voluntary. Participants were given the choice to complete the online questionnaire without completing other parts of the study (interviews, journal, Web activity files), or before completing other parts of the study, or after completing the first interview.
When survey respondents click on the Submit button of the study questionnaire online consent form, they provide implied consent to complete the online questionnaire.

To participate in other aspects of the study apart from the questionnaire, individuals were required to send an email to the researcher expressing their interest in the study. The researcher then contacted interested participants by email or by phone to determine if they met the sampling requirements for this study, and whether they were comfortable completing all components of the study. The researcher met each of these participants at their residence, with a few exceptions. One participant was interviewed at work and data on her health information seeking sessions on the Web were collected from her work computer. Another participant was interviewed at her academic department.

The researcher gave these participants printed consent forms for the interviews and the collection of Web activity files and Web use journals. Upon signature of the consent forms by both the participant and the researcher, the researcher conducted the first interview, which was audio-taped. Once the first interview had concluded, the researcher then installed the WebTracker log application on the participant’s personal computer, and provided instruction on its proper use, as well as the collection of history and bookmark files. For the collection of tracker log files, an online version of the consent form functioned as the default page on the participant’s Web browser (http://www.fis.utoronto.ca/phd/marton/WomensHealth/consentb.html).

3.6 Data collection

3.6.1 Methods of data collection

The methods of data collection were adapted from the *Web Work* book authored by Choo, Detlor and Turnbull (2000, Chapter 6). Four methods of data collection were employed, with the Web survey questionnaire functioning as the primary form of data collection.
First, details of the study were posted online on the researcher’s webpage within the Faculty of Information Studies website at http://www.fis.utoronto.ca/phd/marton/WomensHealth/ and the questionnaire designed by the researcher was connected to a back-end Microsoft Access database using Microsoft Active Service Pages with the assistance of departmental IT staff. The data file that captured responses from the HTML form underlying the questionnaire was ID and password protected. The file was stored in an account (Research Account) that was separate from other FIS accounts and in a directory that was not identifiable to anyone except the researcher. Privacy protection was also guaranteed through the University of Toronto’s policy on Appropriate Use of Information Technology. The questionnaire was online for a six-month period, from November 2000 to April 2001.

Potential participants read the description of the study and then either proceeded to complete the online questionnaire survey first, or contacted the researcher to express their interest in completing interview 1, followed by the other components of the study, which comprise: a journal or diary of health information-seeking episodes on the Web; the unobtrusive collection of Web activity files using WebTracker software, and history and bookmark files from the participant’s home computer, and lastly, interview 2. In either situation, the online questionnaire was completed before interview 2.

Two sets of face-to-face interviews were conducted with each participant who consented to participate in the entire study. Twenty-seven participants completed the interviews. The first set of interviews focus on women’s experiences of health and illness and their experiences as family caregivers. This set of interviews occurred after participants had completed the Web-based questionnaires and had indicated to the researcher by email their willingness to complete the other components of the study, and before installation of the
tracker application. The second set of interviews focus on women’s use of Web-based information sources to locate health information pertaining to personal health concerns or the health concerns of those under their care. It also examined participants’ general Web use, including strategies and preferences, and perception of positive and negative aspects of Web use. The second set of interviews was conducted after the collection of Web activity files and their preliminary analysis. In general, the interviews provide contextually richer data on health information needs, caregiver experiences, and information-seeking behaviour, than is possible with an online questionnaire.

The interview format was based on the principles of the Critical Incident Technique (Flanagan, 1954), in which the ‘incident’ to be studied should be recent, sufficiently complete, and its effects or consequences clear to the individual who has experienced them. This method is similar to Dervin’s time-line interview. It has been extensively used in studies reported in the library and information science literature (Fisher and Oulton, 1999). In the interviews, participants were asked to describe two ‘critical incidents’ of health information seeking on the Web in reply to the following question,

“Please try to recall a recent instance in which you found important health information on the Web, information that led to some significant action or decision concerning your health or the health of those you care for. Would you please describe that incident for me in enough detail so that I can visualize the situation?”

For the face-to-face interviews, harm to participants was minimized by framing questions concerning health concerns and caregiver experiences in the most general terms. Probing for details of specific health conditions/events is avoided, thus preventing the participant from experiencing social embarrassment or humiliation.
For both the questionnaire and the interview, participants could refuse to answer questions without penalty or repercussion. Identifying information was removed by excising the name of the participant from the interview notes after data analysis has been completed. Audiotape recordings of the interviews were erased five years after the completion of the study.

Each individual participating in the entire study kept a journal of Web use to record dates and times the Web was used for health information seeking and the duration of each Web session. Participants also listed which health-related Web-based information sources they visited (websites and Web-based CMC sources) during each Web session and provided evaluations for each Web-based information source. They also noted Web browser actions while visiting these health websites, such as: Print, Save, and Bookmark/Add to Favorites.

The journal of Web use consisted of structured one-page printed sheets with fields for the participant to note the date, time started and ended of each Web session, as well as the type of Web-based information source visited (e.g. website), and a brief evaluation of each Web-based source. The journal entries were kept confidential by the researcher in a securely locked filing cabinet. Identifying information was removed by excising the name of the participant from the journal after data analysis has been completed.

A Tracker application was installed on the home computers of participants who consented to having their Web use sessions monitored. The tracker application runs transparently whenever the participant's Web browser is being used. WebTracker recorded how each participant used the Web browser to navigate the Web and retrieve information from the Web, as well as accessing Web-based computer-mediated communication (CMC) sources, such as bulletin boards, chatrooms, listservs, and
newsgroups. All URL calls and requests, and most browser menu selections were recorded by the Tracker and logged into a local log file on the participant’s hard disk. The Tracker application ran on participants’ computers on average for a 1-2 month period. After this period, the log files collected for analysis. Frequently, they were emailed as file attachments to the researcher. As well, history files and bookmark files generated by the Web browser were collected, where possible. WebTracker was uninstalled by the researcher following the completion of the second interview.

The researcher installed the Tracker application on the participant’s home computer, with a few exceptions as previously mentioned, and trained the participant how to edit Tracker log files and how to switch off the tracker application. Taking into consideration that the collection of Web activity files may raise privacy concerns, the researcher stressed to participants that the WebTracker software can be turned OFF when the participant does not want their Web session to be tracked by having the participant click OFF on the Windows pop-up box for the Tracker. It was also possible for participants to edit their Web log files to remove entries they did not wish the researcher to see.

Because the Tracker application was installed on the participant’s home computer, third-party risks were also taken into account. In households with other residents other than the study participant, collection of tracker log files from Web sessions conducted by other family members was avoided. To prevent other family members from having their Web sessions tracked, the tracker application could not be activated unless the participant double clicked on the tracker software exe file from her computer’s hard drive. No program icon for the tracker software was included in the start-up menu of the
Windows operating system, nor was there any shortcut icon. Furthermore, the default homepage for the Web browser on the study participant’s computer was an online version of the Tracker consent form. Thus, the possibility that others, apart from the study participant, would initiate the Tracker software was greatly minimized.

History files are generated automatically by the Web browser and bookmark files (Favorites in Internet Explorer) are generated by the participant. Both types of files exist independently of the Tracker application, and outside the context of the study. These files reside on the participant’s computer and were collected by the researcher. They were transferred from a 3.5 inch diskette to the hidden directory in the Research Account on the FIS server. To avoid third-party risks, history and bookmark files for participants living in households with shared computer and Internet access were not collected.

3.6.2 Confidentiality and reporting of data
For all methods of data collection, study responses were treated confidentially. Only one individual, the student researcher, had access to the data files. The raw data was not given to committee members or others at the Faculty of Information Studies or elsewhere. All hard-copy data (print, audiotapes, ZIP diskette containing backup of Web activity files and data analysis) was stored securely in a locked filing cabinet in the researcher’s office at FIS, and later, at the University of British Columbia. All raw data was destroyed five years after completion of the study in 2006; paper documents (journal, interview notes) were shredded and electronic files (audiotape and computer files) were deleted. Excerpts from interviews deemed of interest to the study hypotheses and Web use behaviour, as well as summaries of the WebTracker data, and ratings of health websites visited, as noted in Web use journal entries, were retained.
For publicizing study results, only aggregate (e.g. means) responses from the Web survey questionnaire and excerpts from the interview transcripts are reported in the dissertation, and previously, at conferences and in journal publications. A statement describing how participants’ identities are protected was included on the study website and also in the printed consent form.

3.6.3 Questionnaire pre-test
A draft of the questionnaire was developed in September 2000. This draft was pretested with five individuals, several doctoral students and one experienced medical librarian. It was also reviewed by members of the thesis committee. Based on the comments received, revisions were made to the wording of several items, and to the presentation of several items (in HTML) to improve readability and comprehension, and to reduce completion time. The questionnaire can be found in Appendix A.

3.7 Data analysis

3.7.1 Descriptive statistics
A descriptive analysis of all study variables and demographic variables examined in the survey questionnaire was conducted. The descriptive statistics includes measures of central tendency (mean, median, mode), deviation (range, standard deviation), and distribution (skew, kurtosis). The descriptive results from the survey data are reported in the Results Chapter.

3.7.2 Hypotheses testing
For each independent variable, cross-tabulations were computed, and correlation analysis and multiple regression analysis were conducted in tandem, to test the bivariate relationship with the dependent variable. The subjective measure of the dependent variable, frequency of health information seeking on the Web, FSHIW, was obtained from item B4 in the Web survey questionnaire. Recognizing the faceted nature of the Web as an information source (websites) and communication channel (Web-based CMC: Bulletin boards/Chatrooms and Listservs/Newsgroups), three sets of equations were calculated.

**Hypothesis 1** states that *amount of uncertainty* associated with health information needs is positively correlated with the *intensity* of health information seeking on the Web. Subjective measures of the amount of uncertainty associated with health information need were obtained from items in Part D of the Web survey questionnaire.

**Hypothesis 2** states that *family caregiving* is positively correlated with *intensity* of health information seeking on the Web. There are several measures of family caregiving, from general (caregiver status), to specific (caregiver experience), which participants rated using an abbreviated version of Given’s Caregiver Reaction Assessment Instrument (1992), presented in Part E of the Web survey questionnaire.

**Hypothesis 3** states that *Web self-efficacy* is positively correlated with *intensity* of health information seeking on the Web. The measure of Web self-efficacy, derived from Compeau and Higgins (1995), is obtained from the online questionnaire, Part A, item A7.

**Hypotheses 4 and 5** state that the *perceived quality* and *perceived accessibility* of Web-based information sources are both positively correlated with the *intensity* of their use in health information seeking. The perceived quality of each Web-based source is measured both in terms of relevance and reliability. Similarly, the perceived accessibility of each Web-based source is measured both in terms of physical accessibility (time and effort) and
cognitive access (ease of getting information). Both measures were obtained from the online questionnaire, Part C.

### 3.7.3 Multiple regression analysis

To determine which of the five independent variables has the greatest effect on the dependent variable, the intensity of health information seeking on the Web, multiple regression analysis for each of the three posited facets of the Web was undertaken. The following multiple regression model, derived from the general equation for multiple regression (Neter, Wasserman and Whitmore, 1993, p. 599), was tested:

\[
Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \beta_4 X_{i4} + \beta_5 X_{i5}
\]

and:

- \(X_{i1}\) = Health information need
- \(X_{i2}\) = Family caregiving
- \(X_{i3}\) = Web self-efficacy
- \(X_{i4}\) = Perceived quality of Web-based information sources
- \(X_{i5}\) = Perceived accessibility of Web-based information sources

\(X_i\), represents each independent variable and \(\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5\) are the parameters.

For each regression analysis, the model significance and the amount of variance explained by the model were calculated using SPSS for Windows statistical software. Standardized regression coefficients and squared semi-partial correlations were calculated.

Because the initial data analysis, both non-parametric correlation analysis and multiple regression analysis, revealed that many independent variables related to each other, instead of, or in addition to, relating to the dependent variable, an extension of multiple regression analysis, path analysis was undertaken to determine the direction, strength, and significance of these relationships, and to construct a new model that described this web of relationships.
The last part of the data analysis involved intensively reading the interview transcripts for a subset of study participants who had completed all components of this multi-method study, specifically, those experiencing chronic mental health conditions. The purpose of doing so was to achieve an understanding the context of seeking health information on the Web with respect to women’s everyday lives and their experiences with health and illness and family caregiving. Comparing participants’ verbal accounts of their health status and health information needs, caregiving experiences, and their use of the Web, to the statistical findings from the survey data, enabled the researcher to identify commonalities and differences between these sets of data.

3.8 Chapter summary

This chapter presented the conceptual framework for the study. The hypotheses that were tested; the definition and measurement of the variables in the conceptual framework as well as other variables, such as socio-demographic variables; and the data collection and analysis techniques were described. All components of the study were completed by May 2001. A total of 264 completed online questionnaires were received utilizing Microsoft Access database technology to capture survey responses. The next chapter will present the quantitative findings of the study.
Chapter 4

RESULTS

4.1 Chapter overview

This chapter of the dissertation presents the results of the data analysis of the survey questionnaire component of this multi-method study. Information about the respondents and the study variables is presented. Relationships between study variables that comprise the study framework, as well as relationships between study variables that were not predicted by the study framework, are presented. Hypothesis testing and data analysis from the in-depth components of the study (interviews, WebTracker log files, bookmark and history files, and journals of Web use) are detailed in the Discussion Chapter.

4.2 Description of questionnaire respondents

Two hundred and sixty-five women completed the Web survey questionnaire between November 2000 and April 2001, of whom 264 provided complete data. From the contact information provided by survey respondents, as well as from information retrieved from searching on respondents’ names in Web search engines and directories, 224 out of 264 (85%) of participants were positively identified. Therefore, one can be reassured that the identities of individual Web survey data respondents are authentic, a concern that must be addressed, given the prevalence of identity fraud in the online environment.

4.2.1 Demographic variables

Section F of the study questionnaire details the general demographic characteristics of the study sample. There are ten items in this section concerning age, geographic location, occupation, household income, education, primary language, and marital status. Racial identity was added to the survey mid-way through the survey timeframe at the
suggestion of Professor Mark Winston, a professor at School of Communication, Information and Library Studies at Rutgers University at that time, who researches diversity in the workplace.

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>Number in Sample</th>
<th>Percentage in sample (Valid percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>88</td>
<td>34</td>
</tr>
<tr>
<td>25-45</td>
<td>125</td>
<td>48</td>
</tr>
<tr>
<td>45-64</td>
<td>46</td>
<td>18</td>
</tr>
<tr>
<td>Household Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 40,000</td>
<td>125</td>
<td>54</td>
</tr>
<tr>
<td>Over 40,000</td>
<td>106</td>
<td>46</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Sector</td>
<td>62</td>
<td>24</td>
</tr>
<tr>
<td>Other Sector</td>
<td>200</td>
<td>76</td>
</tr>
<tr>
<td>Education (completed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School or College</td>
<td>133</td>
<td>51</td>
</tr>
<tr>
<td>University Degree</td>
<td>129</td>
<td>49</td>
</tr>
<tr>
<td>Primary Language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>243</td>
<td>92</td>
</tr>
<tr>
<td>Not English</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>(French, Spanish, Chinese Punjabi, Hebrew, and Other)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone (single, divorced, widowed)</td>
<td>144</td>
<td>56</td>
</tr>
<tr>
<td>Together (common-law, married)</td>
<td>114</td>
<td>44</td>
</tr>
<tr>
<td>Racial Identity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian (European)</td>
<td>77</td>
<td>83</td>
</tr>
<tr>
<td>Caucasian (Hispanic)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Asian</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>South Asian</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Aboriginal (North American)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Black (Caribbean)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Black (African)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Geographic Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toronto</td>
<td>150</td>
<td>57</td>
</tr>
<tr>
<td>Ontario (other than Toronto)</td>
<td>44</td>
<td>17</td>
</tr>
<tr>
<td>Canada (other than Ontario)</td>
<td>27</td>
<td>14</td>
</tr>
<tr>
<td>United States</td>
<td>29</td>
<td>11</td>
</tr>
<tr>
<td>Outside North America</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 4.1: Description of Study Survey Respondents
Items from Section A represent another set of demographic variables; those pertaining to Internet and Web experience (see Section 4.2.2). The survey also contained an item concerning how participants found out about the study. The date and time of survey responses was also captured for each section of the survey.

**Non-random sampling** was employed using posters, messages to relevant health listservs and newsgroups, and brief messages on websites that included a hypertext link to the Web survey questionnaire, with the intent of obtaining a **purposive sample** that was representative of Canadian women by age and race. However, the study sample of 264 women are predominantly young, well-educated, white (Caucasian), English-speaking, and experienced Internet users. Given these imbalances in demographic representation by age and race, a decision was made to use **convenience sampling**.

Table 4.1 on the previous page provides a summary of the demographic data for the Web survey. Overall, the total number of survey respondents is 264. However, the sample sizes for several study variables are considerably smaller than 264, in particular, family caregiving (n=84) and racial identity (n=93). While the overall sample size is more than sufficient for multiple regression, the sample size associated with specific variables may be insufficient when testing bivariate relationships with these variables using correlation analysis. As well, the predominance of young women entails that many survey respondents are healthy, thereby skewing the objective measurement of health status towards few health conditions of low and moderate morbidity and mortality. These forms of sample bias are manifested as uneven cell sizes for categorical variables. They influence the ability to rigorously test the influence of several study variables on the dependent variable, frequency of seeking health information on the Web. Statistical issues are mentioned in Section 5.11 Limitations.
4.2.1.1 Age

Two hundred and sixty respondents completed item F1 concerning age. The median age group is 25-44. Nearly half of survey respondents (125) are between the ages of 25-45. One-third (88) of respondents are between 15-24 years of age while only 18% fall in the 45-64 age group. When the ordinal variable, age group, is converted to a dichotomous variable for inclusion in inferential statistics (0=45 and under; 1=46 and over), 81% of respondents are 45 and under and only 18% are 46 and over.

Comparisons with the 1996 Canadian census data on age (see Table 3.3, p. 93) reveal that survey respondents aged 15-24 are highly over-represented (34% versus 13%) as are those aged 25-45 (48% versus 32%), while those age 45 to 64 are somewhat under-represented (18% versus 21%) and those over the age of 65 are not represented at all. Thus, the survey sample is skewed towards a younger demographic, which is not surprising given that Internet users at that time were predominantly young adults.

Although age group is reported in the Ontario Health Survey II, see Exhibit 18-1 (p. 220) in the Ontario Women’s Health Status Report (Bondy and Schultz, 2002), the age groups have different cut-off points than this survey study, making comparisons somewhat difficult. However, those in the age groups 40-49 and 50-59 collectively comprise about 33% of the population of women in Ontario, while those of age 60 and over comprise 23% of the population of women in Ontario, and those under the age of 40 represent 44% of the population of Ontario. In comparison with the demographic breakdown by age of this study’s survey respondents, it is again apparent that are survey respondents ages 15-24 and ages 25-45 are over-represented while older Canadians are under-represented.
From a two-nation population based survey study of access to care, health status, and health disparities in the United States and Canada that analyzed 2002/2003 data from the Joint Canada/US Survey of Health (Lasser, Himmelstein, and Woolhandler, 2006), the age distribution of Canadians sampled (n=3505) is 43.3% (18-40); 40.7% (41-64), and 16% (&ge;65), while the age distribution of Americans sampled (n=5183) is 43.6% (18-40); 40.7% (41-64), and 15.6% (&ge;65). Clearly, the age distributions for Canada and the United States are almost identical. In comparison to the samples from the JCUSH study, the percentage of younger age groups (15-24 and 25-45) is much higher in this study’s survey sample.

The demographic profile of survey respondents for the first Pew study on health information on the Web from the analysis by Ronald Rice (2006) of seven Pew studies on this topic is presented in Table 2 on page 15. Surprisingly, the percentage of those who have searched for health or medical information on the Internet is comparable to those who have never done so for age groups 55-64 (21.1% versus 17.4%) and 65+ (4.7% versus 5.2%), and for the age group 25-34 (24.3% versus 24.0%). Not surprisingly, for middle aged Americans in the 35-44 and 45-54 age groups, the percentages are higher for those who have sought health or medical information on the Internet (28.1% versus 21.3% and 21.1% versus 17.4%). For young adults (ages 18-24), the percentage of those who have not sought health information online is almost double that of those who have done so (23.7% versus 12.9%), suggesting that the healthiest group of Americans, by virtue of their youth, is the least likely to use the Internet for this purpose. As has already been demonstrated from comparisons with 1996 Canadian census data on age, respondents from this dissertation’s study survey in the age group 15-24 are over-represented with respect to those in the 18-24 age group in the survey sample from the first Pew study on seeking health information online.
Comparisons can also be made with empirical studies on this topic that have been published in the academic journal literature. The first study was conducted by Warner and Procaccino by postal mail survey in 2002 and was published in 2004. The sample size in their study was 119 women who responded that they had looked for information about healthcare from a total of 133 surveys returned in the mail. The demographic breakdown by age group is presented in Figure 1 (p. 713). In comparison, the number of survey respondents in the age group 15-24 in this survey study (see Table 4.1, p. 112) is much greater than the age group 18-24 in Warner and Procaccino’s study (34% versus under 5%), while the age group 25-45 in this survey study is double in size to that of the age groups 25-34 and 35-44 (48% versus approx. 25%) in the Warner and Procaccino study, demonstrating a large difference between these two survey studies in the proportion of survey respondents 45 and under in age. Those between the ages of 45 to 64 represented almost 60% of their study’s survey respondents, while in this study survey they represented only 18% of survey respondents, a considerable difference. Clearly, the women who participated in Warner and Procaccino’s mail survey study were, on average, older than the survey respondents for this study. However, Warner and Procaccino studied women’s use of multiple types of sources of health information, including but not restricted to the Web, and their sample deliberately included women who did not use the Web to find health information.

In comparing the age distribution of survey respondents in this study to those from Yoo’s dissertation research (2004), which was conducted by mail survey in 2003, it is again evident that this study survey features a younger demographic than the comparison study. Those between the ages of 45 to 64 comprised only 18% of the sample of this study survey, in contrast to 50% of survey respondents in Yoo’s study. Those under the age of 45 comprised 82% of respondents of this study survey, but only 48% of Yoo’s sample of survey respondents.
However, Yoo deliberately sampled women with school-aged children so the difference in age distribution between these two dissertation survey studies is understandable.

Very little demographic data is provided for the next two empirical studies on the topic of seeking health information on the Web. Hong’s study employed an experimental design and although the study timeframe is not mentioned, given the use of Netscape Communicator 4.0 in her study, one can reasonably assume that it was conducted before 2003. Hong sampled eighty-four students from a major university in California; 52 women and 32 men. The mean age of this study is approximately 22. Leung’s random sample of 1,076 respondents aged 18 and older was collected from a telephone survey conducted in Hong Kong in 2006. In this large sample, 53% were Internet users while 47% were non-users. From a total of 569 Internet users in this study sample, 48% were women and 52% were men. The mean age category was 39-40 years of age, which is somewhat higher than the median age group of 25-44 years of age for this study survey.

For the women in IT study conducted in 2000 with a non-random sample of 67 survey respondents (Marton and Choo, 2002), the frequency distribution for age was as follows: 3% between ages 15-24; 69% between the ages of 25-44; 28% between the ages of 45-64. Compared to this dissertation study survey sample, the women in IT study survey sample had far fewer respondents in the youngest age group, but more respondents in the middle age group, and also in the oldest age group (28% versus 18%), which is unsurprising given that the women in IT study surveyed women employed in the IT sector, while this study sampled women from the general public and unintentionally included a large number of university students.
4.2.1.2 Geographic location

All 264 survey respondents completed item F2 on geographic location; geographic location within Canada. This item was also re-coded as a dichotomous variable (0=outside Ontario, 1=Ontario). More than half of all survey respondents (150) resided in Toronto and nearly three-quarters resided in Ontario (194). Those who resided outside of Ontario represented Quebec (3), Eastern Canada (14), Western Canada (20), the United States of America (29), and other locations around the world outside of North America (4).

In the 1996 Census of Population, the population of Canada was 28,846,761 and the population of Ontario was 10,753,573, of whom 8,958,741 lived in urban areas. Toronto was the largest city in Canada, with a population of 4.3 million, which comprised 40% of the population of Ontario. However, in this study’s survey sample, the percentage of Torontonians relative to the population of Ontario was 77%, which is almost double that of its actual representation. In the Ontario Women’s Health Status Report (Bondy and Schultz, 2002), women in Toronto represented approximately 23% of the population of Ontario. Since this study survey employed convenience sampling and no attempt was made at regional representation within Canada, comparing the geographic distribution of study survey respondents from Canada with the province-by-province population of Canada serves no practical purpose with respect to data analysis.

4.2.1.3 Occupation

Two hundred and sixty-two respondents completed item F4 on current occupation. Survey respondents represent a wide variety of occupations, grouped, ranked from highest to lowest number: student, undergraduate (59); student, graduate (31); health care practitioner (28) student, health science (14), librarian or other information professional (14);
unemployed/retired (13); computer/Internet professional (13); homemaker/housewife/mother (11); clerical/secretarial/administrative (11); student, not otherwise specified (NOS): (11); manager (9); educator (8); sales (7); researcher (5); writer (4), and analyst (3). Clearly, the largest occupational category is that of student. Unskilled occupations are under-represented in the study sample. When this nominal variable is recoded as a dichotomous variable (0=non health occupation; 1=health occupation) to investigate the role of domain knowledge in this survey study sample, it is evident that slightly more than three-quarters of respondents work in occupations unrelated to health care.

From the 1996 Census of Population data on labour force activity (Statistics Canada, 1996, see Nation Tables), approximately 8 million Canadians worked full-year, full-time, in 1995, a 2.6% decrease from 1990. In the same year, approximately 1.2 million Canadians worked part-time throughout the year, an increase of nearly 20% since 1990, and almost double the number of part-time employment since 1980. The number of men working full-time throughout the year declined more than the number of women working full-time throughout the year (4% versus 1%) and the number of men working part-time for the full year increased more than for women (28% versus 16%). Overall, women were more likely to work part-time throughout the year than men (12% versus 4%). As well, self-employment increased 28% from 1991 to 1996, accounting for almost 13% of the Canadian labour force, a trend that was particularly evident for women.

The strongest job growth was seen in the service-producing industries, in particular, business services, a sector with a large increase in part-time employment, and a sector with substantial female representation (26%). The largest of the ten occupational categories was the sales and service category, which employed one in every three women in Canada. Of interest, women were employed in the health sector in greater numbers than men: 566,625 versus 152,825.
Direct comparisons with the breakdown by occupation in the study survey are not possible because occupational categories differ. As well, no attempt was made in this study to sample proportionately by Statistics Canada occupation groups. However, it is evident that several census employment sectors were represented in this study, namely, health, management, business/finance/administrative, sales, and education.

Demographic data on occupation and employment are not provided in the Ontario Women’s Health Status Report or the JCUSH. Nor is this type of demographic data found in the majority of the academic research on women seeking health information on the Web. The demographic profile of survey respondents for the first Pew study on health information on the Internet by employment status (Rice, 2006) solely reports on full-time versus part-time employment for those who seek health information on the Internet versus those who do not. These two groups were equivalent in terms of employment status (Table 2, p. 15). Yoo (2004) provided a profile of employment status for her mail survey sample, as follows: 56% were employed full-time; 30% were employed part-time; 2% were looking for a job; 9% were not in the labour force; less than one percent were self-employed; less than one percent was laid off, and approximately 2% selected “other”.

For the women in IT study conducted in 2000 (Marton and Choo, 2002), survey respondents represented many fields and specialties in the IT sector, including faculty librarian, webmaster and web designer, database developer, and management positions, and many settings in both the public and private sectors, as well as self-owned businesses. In this dissertation study, 13 respondents listed computer/Internet professional while 14 respondents selected librarian or other information professional, indicating some degree of overlap in occupations between these two survey studies.
4.2.1.4 Household income

For item F5, household income in Canadian dollars, two hundred and thirty-one respondents completed the question. The median household income category is 4 ($30,000-$39,999). The frequency distribution for income is as follows: under $10,000 (46); $10,000-19,000 (37); $20,000-$29,000 (16); $30,000-$39,999 (26); $40,000-$49,999 (29); $50,000-$74,999 (31), and $75,000-$99,999 (30). When this demographic variable is recoded as a dichotomous variable (0=under $40,000; 1=$40,000 and over), the frequency distribution for household income is 125 (54%) for $40,000 and under, and 106 (46%) for household income over $40,000, indicating an equal number of survey respondents for each of these two categories of household income.

From the 1996 Census of Population data on family and household income (Statistics Canada, 1996, see Nation Tables), there were 10,820,050 households in Canada in 1995, with an average household income of $48,552, an almost 6% decrease since 1990. Thus, the median household income category of $30,000-39,999 for this study survey sample is more than $10,000 less than the national average reported in 1995, and considerably less than the average household income of $54,291 in the province of Ontario, itself a 7% decrease from 1990 Ontario average of $58,325. It is also considerably smaller than $64,044, which was the average family income in Toronto in 1995. However, of interest to note, the median household income for this study's survey sample was actually somewhat higher than the average family income in Toronto for female lone-parent families, which was $32,345 in 1995.
Comparisons with the demographic data on household income reported in the Ontario Women’s Health Status Report are difficult to make because household income is categorized as low; low-middle; upper-middle; high, and not-stated. As well, there was a low response rate for this variable. Approximately 32% of women aged 18 and over in Ontario in 1996/97 had low or low-middle household income (Bondy and Schultz, 2002). Since the median household income category in this survey study sample is $30,000-39,999, with 54% reporting a household income of under $40,000, it is evident that the sample of women in this study had proportionately lower household income than reported in the OHS II, presumably because of the large number of students in this sample.

In the JCUSH study (Lasser, Himmelstein, and Woolhandler, 2006), approximately 13.5% of the Canadian sample and 12.9% of the American sample fell in the 0-19,999 US$ household income category; 22.2% of the Canadian sample but only 17.9% of the American sample were represented in the 20,000-34,999US$ range; 39.6% of the Canadian sample and 35.5% of the American sample were represented in the 35,000-69,999US$ range, and 24.7% of Canadians but 33.7% of Americans made $70,000US$ or more. Clearly, more Americans are represented in the lower household income categories, while both countries have approximately the same number of middle-class citizens, and the United States has more high-income citizens. In other words, the United States has greater income disparities than Canada. While the income categories are not directly comparable, it is evident that this study’s survey sample has more respondents of low household income than the JCUSH study samples of men and women in Canada and the United States.

Demographic data on household income is reported in several studies of health information seeking on the Internet/Web. The demographic profile of survey respondents by income for the first Pew study on health information on the Internet by employment status
(Rice, 2006) is displayed in Table 2 (p. 15). Income categories are reported in 10,000US$ increments. When income categories are collapsed to those matching the dichotomous categories for this survey study, it is apparent that 35.6% of those who search for health or medical information on the Internet and 37.5% of those who do not, have an income of under 40,000US$, while those with an income greater than 40,000US$ comprise 64.4% of those who seek health information on the Internet and 62.5% of those who do not, demonstrating that this online behavior is equally represented by income category. In comparison to this study’s survey respondents, the Pew study telephone survey respondents have a higher income.

In Yoo’s 2003 doctoral dissertation mail survey study (2004), approximately 11% of the sample had an income of under 30,000US$, 16% had an income of 30,000-49,999US$, and an astonishing 75% earned at least 50,000US$, with 8% represented in the 150,000US$ and higher category. Clearly, the majority of middle-aged women that comprised Yoo’s study sample earn at least a middle-class income, and as she notes, have a greater representation in the high income categories than citizens of the city, when compared to the city census. Clearly, the distribution of household income is skewed towards higher income brackets in Yoo’s study (2004) while the distribution of household income is skewed towards the lower income brackets in this study’s survey sample. This difference in household income between the two survey samples can be attributed to the difference in distribution of age groups.

### 4.2.1.5 Education

Two hundred and sixty-two respondents completed item F6 concerning highest level of education obtained. The median and mode is category 5 - Bachelor Degree in progress/completion of College Diploma. The frequency distribution indicates a large number of participants currently enrolled in undergraduate university studies or having completed a
college diploma (83), approximately one third of the survey sample, as well as a large number who have completed their bachelor degree (47), and almost as many who are undertaking graduate studies (41) or have completed a graduate or professional degree (41).

When this variable is recoded as a dichotomous variable (0=secondary school or college completed; 1=university degree completed), the study sample is almost evenly split between those who have completed secondary school or college (133) and those who have completed a university degree (129). Very few respondents possess solely a secondary school education. Overall, the study sample is disproportionately comprised of well-educated women, relative to the educational level of Canadian women in the general population.

From the 1996 Census of Population data on education (Statistics Canada, 1996, see Nation Tables), the total number of women in Ontario with a certificate or diploma of any kind was 4,348,270, compared to a total of 4,080,945 men in Ontario, with 2,132,580 women in Ontario in the 20-44 age group, and 1,168,770 in the 45-64 age group. However, a total of 1,541,860 of women in Ontario at that time had no degree, certificate or diploma, a number that is somewhat higher than that for men in Ontario (1,411,745). A total of 1,094,170 women in Ontario had a secondary school graduation certificate, higher than the number of men in Ontario (912,250), with 637,330 women between 20-44 years of age. More women than men in Ontario had an educational achievement of other non-university certificate or diploma (748,300 versus 511,555). A total of 687,420 of women in Ontario of all ages had a university degree, certificate, or diploma, with 463,940 between 20-44 years of age. More men than women had a university degree, certificate or diploma (732,825). For all levels of academic attainment, the age group 20-44 years achieved the highest representation. In comparison, this study’s survey sample demonstrated an almost even distribution between those with high school or college level education (51%) and a university degree (49), a higher proportion of women with
university-level education than found in the general population of Ontario. This is not surprising, given the large number of students in this sample, many of whom were undergraduates or had completed a college diploma or undergraduate degree. Conversely, the study sample has very few respondents with a high school certificate (9%), or some college education (11%). This segment of the sample is disproportionately small relative to the population of Ontario. Overall, the respondents in this study’s survey sample are highly educated. This conclusion is verified by the socio-demographic data published in the Ontario Women’s Health Status Report. Women aged 18 and over in Ontario in 1996/1997 with less than a high school education represented 23.5% of this sample, while 41% had achieved a high school certificate, and 35.6% were college or university graduates. From the JCUSH study demographic data (Table 1, p. 1302), 49.2% of the Canadian sample and 50.8% of the American sample had attained a formal education beyond high school.

Demographic data on education is reported in several studies of health information seeking on the Internet/Web. The demographic profile of survey respondents by education for the first Pew study on health information on the Internet by employment status (Rice, 2006) is displayed in Table 2 (p. 15). In this sample, it is evident that more respondents who have never searched for health or medical information on the Internet are represented in greater numbers at the lowest two levels of educational attainment (less than high school, high school graduate), 4.7% versus 2.6% for less than high school education, and 28.0% versus 22.9% for high school graduate. Conversely, those who have searched for health information online are represented more strongly in higher levels of educational attainment, 30.0% versus 28.7% for some college, and 44.4% versus 38.6% for college graduate or higher. Clearly, the average level of educational attainment reported for the 2000 Pew Institute study is considerably lower than that observed in the sample for this study’s survey. From the demographic data on highest level of completed education in Warner and Procaccino’s 2002 study (2004) presented in Table 1 (p. 713), high school graduates
comprised almost 12% of their study sample; only 3.4% had a vocational or trade school education; 19.3% had some college education; 21.0% were four-year college graduates (presumably a bachelor’s degree); 10.1% had more than 4 years of post-secondary education, while 26.9% had a graduate school education, and 7.6% had a professional school education. Overall, the demographic breakdown by education of the sample in Warner and Procaccino’s study features an even higher number of well educated women than is represented in this dissertation survey study.

The distribution by education in Yoo’s mail survey study (2004) indicates a more balanced distribution (Table 4.3, p. 87), with 13.5% possessing high school education or less; 12.6% with a vocational/technical college education; 29.5% with some college; 30.7% who were 4-year college graduates (university undergraduate degree), but only 1% with a master’s degree or above. Relative to the census for the city in which her study was conducted, those with high school or less education are over-represented; those with a bachelor’s degree are comparable in number, while those with a graduate degree are very much under-represented. For Hong’s study (2006), all participants were undergraduate students. Leung (2008) does not provide the frequency distribution by education for his 2006 telephone survey study in Hong Kong. Overall, one can conclude that those who participated in studies on health information seeking on the Internet/Web are better educated than the general population.

For the women in IT study conducted in 2000 (Marton and Choo, 2002), survey respondents represented a range of educational levels, but were predominantly well educated. Nearly half had obtained a university baccalaureate degree (42%), while 27% had completed a master’s degree, and 4.5% had completed a doctorate. However, 21% had only completed high school, while 6% had a college diploma. Clearly, the women in the survey sample of the women in IT study were better educated than the women studied in this dissertation study, a reflection of their younger age demographic.
4.2.1.6 Primary Language

Two hundred and sixty-one respondents completed item F7 concerning primary language, the language spoken most often. The mode for this nominal variable is 1 (English). The frequency distribution indicates that 90% of respondents speak primarily English (237). Non-English speakers (24) represent a variety of European languages as follows: French (5), Polish (4), and Finnish, Russian, Danish, Croatian and Bosnian (7). Non-European languages were also represented, as follows: Chinese (4), Turkish (1), Punjabi (1), Tagalog (1), and Hebrew (1).

The 1996 Census of Population provides demographic data on mother tongue (the first language learned at home in childhood and still understood) and home language (the language spoken “regularly” at home), respectively (Statistics Canada, 1996, see Nation Tables). The total number of Canadians who reported English as their mother tongue was 16,890,615, out of 28,528,125 respondents (59%). The total number of Canadians who reported French as their mother tongue was 6,636,660 (23%). Canadians who reported non-official languages as their mother tongue totaled 4,598,285 (16%). Much smaller numbers of Canadians were represented by these categories: English and French; English and non-official language; French and non-official language; and English, French and non-official languages. In the 2001 census question on mother tongue, more than 100 languages were reported, with Chinese identified as the third most common mother tongue in Canada. The number of people who reported Chinese as their mother tongue in 2001 totaled 872,400, nearly 3% percent of the population of Canada, an increase of approximately 0.3 percent since 1996. The other most commonly reported languages in the 2001 census were: Italian, German, Punjabi, and Spanish.
For the province of Ontario, 7,694,630 out of a total of 10,642,790 (72%) for this item selected English, while 479,285 selected French (4.5%). Of interest, is the number of Ontarians who selected Non-official languages (2,296,570), which represented of 22% of Ontarians. The category of English and non-official category had 130,730 respondents, while those who selected English and French (official bilingualism) only numbered 33,940. Clearly, the vast majority of Ontarians at the time of the 1996 census were English-only speakers. However, those who speak non-official languages vastly outnumber both those who speak French-only and those who are bilingual in English and French, in this province.

The second language variable in the 1996 census is home language. English was the home language for 19,031,335 Canadians out of 28,528,125 respondents (67%). French was identified as the home language for 6,359,505 Canadians (23%), while 2,556,830 Canadians reported non-official languages as their home language (9%). English and non-official language was selected by 397,435 respondents, and 119,965 respondents chose English and French. In Ontario, English was selected by 8,773,295 out of 10,642,790 respondents (82%) while French was selected by only 287,190 respondents (2.7%), and non-official languages was selected by 1,323,850 respondents (12.4%). The next largest category was English and non-official language (218,405) followed by English and French (34,985).

For both language variables in the 1996 census, a comparison of the demographic breakdown in the province of Ontario with the Primary Language item in the study survey, reveals that English speakers are over-represented in this study’s survey sample, relative to their percentage in the province of Ontario (90% versus 72% or 82%). Since the census data does not provide a frequency distribution for non-official languages, comparisons with the percentages of non-English or French languages represented in this study survey sample are not possible. However, it is interesting to note the large
number of respondents for both census language items who selected non-official languages, as well as those who selected English and non-official language. Primary language is not reported in the Ontario Women’s Health Status Report or the JCUSH bi-nation study.

Most studies of health information seeking on the Internet/Web do not report primary language. Also, it is not reported in the demographic data for the 2000 Pew study on health information seeking on the Internet (Rice, 2006); Warner and Procaccino’s 2002 study (2004); Hong’s study (2006), or Leung’s 2006 study (2008). However, given that Leung’s study was administered by telephone survey in Hong Kong, it can be inferred that the primary language for survey respondents was Cantonese-Chinese, although English and Mandarin are also official languages in Hong Kong. Also, many other languages are spoken in Hong Kong, including Asian languages such as Japanese, Vietnamese, Korean, Indonesian, Thai, and Tagalog; South Asian languages, such as Hindi, Urdu, Nepali, Sindhi, and Punjabi, European languages, such as German and French, and also Arabic from the Middle East. Primary language is a demographic variable in Yoo’s dissertation mail survey (2004). The distribution of primary language in her study sample is as follows: 87% English; 3.5% Spanish; 2% Hmong; 1.7% Chinese; almost 1% Korean, and 4.7% other. Clearly, English speakers are over-represented while speakers of other languages in the United States are greatly under-represented in Yoo’s dissertation research survey sample.

Overall, the demographic distribution of primary language in this study’s survey sample over-represented English speakers in Canada and under-represented Francophones and speakers of non-official languages in this country. Similarly, English speakers in the United States were over-represented while speakers of Spanish, the second most-common language in the United States, and also speakers of languages other than English or Spanish, were under-represented in Yoo’s dissertation mail survey sample (2004).
4.2.1.7  Marital Status

Two hundred and fifty-eight respondents completed item F8 concerning current marital status. For this nominal variable, the mode is single (category 1), with 130 respondents representing this category (50%). The frequency distribution is as follows: single (130); married (86); common-law (28); divorced (12), and widowed (2). When this item is recoded as a dichotomous variable (0=alone; 1=together), where the category of alone comprises single, divorced and widowed, and the category of together includes married and common law relationships; 144 respondents are alone and 114 respondents are in a long-term relationship. Note, this form of measurement does not take into consideration short-term relationships. Overall, most respondents are single, however, nearly half are either married or in a common-law relationship.

The 1996 Census of Population data on marital status (Statistics Canada, 1996, see Nation Tables) has five categories: never married (single); married (including common-law); separated; divorced, and widowed. A total of 22,945,485 Canadians completed this census item. Of those Canadians who have never married (single), there are 2,195,345 women (35%) versus 2,676,090 men (43%) in the 15-34 age group; and 445,290 women (7%) and 576,135 men (9%) in the 35-59 age group; and 171,220 women (7%) and 131,490 men (2%) in the age group 60 and over. Thus, in this age group more men than women under the age of 59, while more women than men age 60 and over are single. Of those Canadians who are married (including common law), there are 1,802,355 women (13%) versus 1,405,615 men (10%) in the 15-34 age group; 3,719,085 women (27%) versus 3,791,655 (28%) in the 35-59 age group, and 1,259,675 women (9.3%) versus 1,589,090 men (11.7%) in the 60 and over age group. The numbers of married men and women in Canada are roughly comparable across age groups. Of those Canadians who
are separated, there are 85,125 women (14.5%) versus 48,165 men (8.2%) ages 15-34; 200,045 women (34%) versus 157,845 men (27%) ages 35-59, and 49,635 women (8.4%) versus 47,895 men (8%) ages 60 and over. Overall, there are more women than men who are separated in Canada. However, the gender difference decreases with age. Of those Canadians who are divorced, there are 84,900 women (7.3%) versus 50,435 men (4.3%) in the 15-34 age group; 474,565 women (40.5%) versus 336,755 men (28.7%) in the 35-59 age group, and 132,155 women (11.3%) versus 92,535 men (8%) in the 60 and over age group. Again, it is evident that women outnumber men at every age in this marital status category. Lastly, of those Canadians who are widowed, there are 6,215 women (0.44%) versus 1,835 men (.13%) in the 15-34 age group, 140,850 women (9.9%) versus 31,585 men (2.2%) in the 35-59 age group, and 1,034,210 women (73%) versus 207,685 men (14.6%) ages 60 and over. At each group, women are widows in far greater numbers than men, especially in old age. From the census data, it is evident that Canadian women are more likely than Canadian men to be separated, divorced, or widowed, and thus are alone in their senior years.

For the province of Ontario, a total of 8,539,350 citizens of all ages 15 and over answered this census item on marital status. Of those Ontarians who have never married (single), there are 834,605 women (37%) versus 999,840 men (44%) in the 15-34 age group; 153,740 women (6.8%) versus 186,460 men (8%) in the 35-59 age group, and 51,390 women (2.3%) versus 38,995 men (1.7%) in the 60 and over age group. Thus, in this age group more men than women under the age of 59 in Ontario have never married (single), while more women than men age 60 and over in Ontario have never married (single), as was demonstrated on the previous page for the population of Canada. Of those Ontarians who are married (including common-law), there are 665,945 women (13%) and 512,145 men (10%) in the 15-34 age group; there are 1,395,955 women
(27.4%) and 1,415,130 (27.8%) men in the 35-59 age group, and there are 490,385 women (9.6%) and 616,920 men (12%) in the 60 and over age group. These percentages are roughly comparable by gender across age groups.

The demographic data on marital status in Ontario reveals a gender difference for those who are separated, divorced, or widowed, indicating that older women in Ontario are more likely to be alone than men, as was noted on the previous page for the 1996 census data for the population of Canada. Of those Ontarians who are separated, there are 38,905 women (15.7%) and 21,045 men (8.5%) in the 15-34 age group; there are 85,660 women (35%) and 64,855 men (26%) in the 35-59 age group, and there are 19,365 women (7.8%) and 17,950 men (7.2%) in the 60 and over age group. More women than men in Ontario are separated. However, this gender difference diminishes with age. Of those Ontarians who are divorced, there are 33,580 women (8.4%) and 19,370 men (4.8%) in the 15-34 age group, there are 161,505 women (40%) and 108,665 men (27%) in the 35-59 age group, and there are 48,045 women (12%) and 19,370 men (4.8%) in the 60 and over age group. More women than men in Ontario are divorced, however, this gender difference decreases with age. Of those Ontarians who are widowed, there are 2,430 women (.45%) and 675 men (.125%) in the 15-34 age group; there are 52,840 women (9.8%) and 11,415 men (2%) in the 35-59 age group, and there are 393,485 women (73%) and 78,750 men (14.6%) in the 60 and over age group. For each group, the number of women in Ontario who are widows far exceeds the number of widowed men.

Comparing the demographics of marital status in this study’s survey sample to that of the 1996 census data for both Canada and Ontario, it is evident that singles are over-represented, even for the youngest demographic, 15-34 years of age, with 50% of this study’s survey respondents having selected single, in comparison to 35% in the census.
As well, respondents who selected married (33%) and common law (11%), for a total of 44%, are also over-represented in this study relative to their percentage in the population of Canada and of Ontario (27-28%). However, those who were divorced (5%), or widowed (.78%) comprised an extremely small number of survey respondents compared to the 1996 census data on marital status. The higher representation of both single and married/common-law individuals in this study’s survey sample is a reflection of the large number of young women in this study.

For the 2000 Pew Institute study on health information seeking on the Internet analyzed by Rice (2006), the demographic distribution for marital status is as follows: 63.4% of those who have sought health or medical information online versus 53.3% of those who have not done so, were classified as married/living as married, while 36.6% of those who have sought health or medical information online versus 46.7% of those who had not done so, were classified as otherwise, a category that presumably encompasses single, divorced, separated, and widowed. A greater percentage of those who had sought health or medical information online were married/living as such compared to those who had not done so, and also in comparison to the percentage of this study’s survey sample respondents who were married/common-law. In Yoo’s 2003 dissertation survey study, the respondents were overwhelmingly married (82%), which is not surprising given that she deliberately sampled women with children. For the other categories, 14% were divorced, almost 2% were never married (single), almost one and half percent were widowed, and almost 2% had selected “other”. Clearly, this study’s survey sample is not comparable in terms of marital status to that of Yoo’s survey sample, which can be attributed to the large number of young women in this study.
4.2.1.8  Racial identity

Ninety-three respondents completed item F9 concerning racial identity. Additionally, thirteen chose the option “rather not say” while six selected “scroll down” and 158 responses were missing, for a total of 171 missing responses. Note, this nominal variable was added midway in the timeframe of the Web survey, on February 20, 2001, which accounts for the seemingly low response rate. This variable is labeled RaceTr. The frequency distribution indicates the vast majority of respondents identify as Caucasian(European) (77), with other categories represented as follows: Caucasian(Hispanic) (2); Asian (10); South Asian (1); Black(Caribbean) (1), and Aboriginal(N.A.) (2). Because nominal variables cannot be included in inferential statistical tests such as multiple regression and path analysis, this variable was recoded as a dichotomous variable: Caucasian (79) and non-Caucasian (14), which provided a ratio of 85% white: 15% non-White.

Comparing the frequency distribution for this variable with the data on race from the 1996 Census of Canada (as reproduced in Table 3.3 on page 93), it is evident that the proportion of Caucasian(European) in the survey sample (83%) is higher than that value of 72% obtained from the 1996 census when the categories British Isles, French, Other European, and Canadian, are summed for Toronto (column 3). However, the percentage of Caucasian(European) in this study is smaller than the census data for Ontario (column 2), with a total of 86.5%, and Canada (column 1), with a total of 101.1% for this racial group. The census data indicates that Toronto in 1996 was racially more diverse than the province of Ontario and the nation as a whole. Also evident from the 1996 census data on this racial category, is overlap between groups that comprise this category. Presumably a segment of the Canadian population selected more than one category, reflecting a mixed heritage.
The percentage of Caucasian(European) respondents in this study survey is comparable to the socio-demographic profile of Ontarians reported in the Ontario Women's Health Status Report (Bondy and Schultz, 2002), where the largest group of women comprised Northern/Western European (43%) and Canadian/US (29%), and Southern/Eastern European (10%), for a total of 81%. From the demographic data of the bi-nation JCUSH study (Lasser, Himmelstein, Woolhandler, 2006), Whites comprised 82.1% of the Canadian sample of 3505 men and women, and 72.3% of the American sample of 5183 men and women. Thus, the percentage of Caucasian(Europeans) obtained from the study’s survey sample (83%) is comparable to percentage reported in the Ontario Women’s Health Status Report (81%) and the Canadian sample in the JCUSH study (82%).

In the first Pew study on seeking health information online, (Rice, 2006), White non-hispanics comprised almost 80% of those who had sought health or medical information online, and almost 78% of those who had not done so. In Warner and Procaccino’s mail survey study conducted in 2002 (2004), 91% of survey respondents were White/Caucasian. In Yoo’s dissertation survey study conducted in 2003 (2004), almost 82% of survey respondents were White. Hong does not provide any information on the racial composition of her study’s participants. However, since her study was conducted at a major university in California, one can assume that many participants were White, and that other races were also represented to some extent. The racial composition of Leung’s study (2008) is also unknown. However, since this telephone survey study was conducted in 2006 in Hong Kong, one can safely assume that the majority of participants were Asian, specifically Chinese.

What is of equal or greater interest in this study’s survey sample is the breakdown of non-white racial categories, also referred to as racial minorities or visible minorities. **Asians** represented 11% of survey respondents, which is quite comparable to the 1996
census data for Toronto, where the percentage is 11.5% for Toronto, but only 5.5% for Ontario, and 4.4% in Canada overall (see Table 3.4 on page 94). Clearly, Asians comprised the largest racial minority category not only in this study’s survey sample, but in the city of Toronto, the province of Ontario, and in the nation of Canada as a whole. When the frequency distribution for the questionnaire item on language is examined in Section 4.2.1.6 on page 113, it is apparent that Chinese is the major non-European language in this study’s survey sample. Thus, it is plausible that Chinese-Canadian survey respondents represent the majority of those who selected Asian as racial category. Overall, the representation of Asians in this sample for this study, undertaken in 2000-2001, is comparable with the percentage of Asians in Toronto in 1996.

The percentage of Asian women in Ontario reported in the Ontario Women’s Health Status Report (Bondy and Schultz, 2002) was 8%. This data included women who identified as South Asian and Middle Eastern, which are distinct racial categories in this study’s survey. Examining the demographic data from the JCUSH cross-national population-based survey, Asian is not a distinct racial category in Table 1 (p. 1302) but falls within Other/multiple race, which encompasses all racial categories apart from White, Black, and Hispanic. Here the percentages are 15.7% for the American sample and 17.9% for the Canadian sample (Lasser, Himmelstein, and Woolhandler, 2006).

The demographic data from the 2000 Pew study on seeking health information online (Rice, 2006, p. 15) did not identify Asians as a distinct racial category. Presumably Asians were included in the 5.8% of “Other” Americans who have searched for health or medical information and the 6.6% of Americans who have not done so. However, a study on race/ethnicity and Internet use conducted by the Pew Institute in 2000 found that Asian-Americans who speak English are both the most wired racial/ethnic group in the United
States and the most experienced and heaviest users of the Internet. More Asian-Americans were online in 2000 (75%) than Whites (58%), Hispanics (50%) and African-Americans (43%). This finding is attributed to the high levels of education and household income of Asian-Americans (Spooner, 2001).

In Warner and Procaccino’s mail survey study conducted in 2002 (2004), 3% of survey respondents were Asian. In Yoo’s dissertation survey study conducted in 2003 (2004), almost 9% of survey respondents were Asian/Pacific Island, almost double the percentage of Asian/Pacific Islanders residing in the American city in which she conducted her study. In Leung’s study (2008), survey respondents were, in all likelihood, predominantly Chinese, because his study was conducted in Hong Kong.

Aboriginals comprised 2% of study survey respondents, which was consistent with their numbers in the Canadian population according to 1996 census data (see Table 3.4), and greater than their representation in the populations of Ontario (0.7%) and Toronto (0.13%), respectively. This racial group was not represented in the 2000 Pew study on seeking health information online (Rice, 2006), nor was it included in Warner and Procaccino’s 2002 mail survey study (2004). While this racial category was included in Yoo’s 2003 dissertation survey study (2004), none of the respondents selected this category, which is congruent with the non-representation of this racial group in the census for the city where the study had been conducted.

Hispanics (Latin/South American) represented 2% of survey respondents, which is greater than their representation in the 1996 census in Toronto (0.9%), Ontario (0.5%), and Canada (0.4%). The United States has a far larger Hispanic population than Canada. Studies conducted in the United States, including the 2000 Pew Institute study, which
had 5.9% Hispanic respondents who had sought health or medical information online and 6.65% who had not (Rice, 2006); the 2002 Warner and Procaccino study (2004), which had 1% Hispanic respondents, and Yoo’s 2003 dissertation study (2004), which had 5.23% Hispanic respondents, which was somewhat more than the percentage of Hispanics (4.1%) residing in the city in which her study was conducted.

**South Asians** represented only 1% of this study’s survey respondents, but comprised 7% of Torontonians, 5.5 of Ontarians, and 2.5% of Canadians in the 1996 census data. Surprisingly, South Asians were not represented in the other studies of women seeking health information on the Web.

**Afro-Caribbean Canadians** comprised only 1% of survey respondents, which is consistent with 1996 census data for Canada. However, their numbers are under-represented in relation to the population of Toronto (4%) and Ontario (2%) in 1996, respectively. **Black Africans** were not represented in the survey respondents for this study at all, despite representing 2% of the population of Toronto, almost 1% of the population of Ontario, and half a percent of the population of Canada, according to 1996 census data. The socio-demographic profile of women in Ontario from the Ontario Women’s Health Status Report (Bondy and Schultz, 2002) grouped together Hispanic, Caribbean, Jewish, and Black women. Their representation is collectively 6% of the population of Ontario women, suggesting under-representation of women of colour. From the JCUSH cross-national population-based survey data collected in 2002-2003, Blacks comprised 12% of the United States sample, but an extremely small percentage of the Canadian sample, such that the researchers were unable to provide a percentage value for this racial group (Lasser, Himmelstein, and Woolhandler, 2006).
Blacks or African-Americans are represented in the majority of studies on health information seeking on the Internet/Web, because these studies were conducted in the United States, where they represent a sizable racial demographic. In the 2000 Pew Institute study (Rice, 2006), the Black non-hispanic racial category achieves 8.6% of respondents who have sought health or medical information online, and 8.3% of those who have not done so. In Warner and Procaccino’s 2002 survey study (2004), Blacks represented 3% of the sample, while in Yoo’s 2003 dissertation survey study (2004), they represented 2.62% of survey respondents, approximately half of their percentage in the city census. Clearly, Blacks/African-Americans are under-represented in this study’s survey sample, but that under-representation is found consistently in other studies on the topic of seeking health information online which were conducted in the United States, where the percentage of Blacks in 1996 was almost 13%, according to the US Census Bureau (Bennett, 1997).

In Warner and Procaccino’s mail survey study conducted in 2002 (2004), 3% of survey respondents were Black. In Yoo’s dissertation survey study conducted in 2003 (2004, p. 87), 2.6% of survey respondents were Black, almost half the percentage of Blacks (5.8%) residing in the American city at the time she conducted her dissertation study.

Summarizing the findings on racial identity from this study survey and comparisons made to data on race from the 1996 Statistics Canada census, the Ontario Women’s Health Status Report, the cross-national population-based survey on access to care, health status, and health disparities in the United States and Canada conducted in 2002-2003, the demographic data from the first Pew study on health information on the Internet in 2000 (Rice, 2006), and academic studies on this topic, it is evident that
Caucasian (Europeans) or Whites and Asians are well represented or over-represented. Aboriginals and Hispanics are adequately represented in this study’s survey respondents, in relation to their representation in general population of Canada. However, South Asians, Blacks (Africans and Afro-Caribbean), as well as those from the Middle East, are under-represented or not represented at all, particularly in relation to their numbers in the 1996 population of Toronto. However, the under-representation of these racial groups, in the form of a racial colour gradient with those of light colour well represented and those of dark color under-represented, is not unique to this study’s survey sample, but has been observed in other studies on this topic. Indeed, the under-representation of visible minority races in research is not an uncommon phenomenon, even in well-funded and well-staffed national studies such as the Pew Internet studies and the binational JCUSH.

A study on predictors of response rates and nonresponse bias in Web and paper survey (Sax, Gilmartin, and Bryant, 2003) administered to a population of American university students revealed that women respond at significantly higher rates than do men to both paper and Web and mixed paper/Web surveys. For race/ethnicity, descriptive statistics demonstrated that response rates for Asian American students were the highest respondents while African American students and Indian students had the lowest rates of response. However, multivariate analyses did not reveal unique effects by race on the likelihood of response, possibly because sample size per racial/ethnic group was small.

Wendler et al. (2006) contend that racial and ethnic minorities in the United States are as willing as non-Hispanic whites to participate in health research and the very small differences found in the willingness of minorities, mostly African-Americans and Hispanics,
to participate in health research may be attributable to disparities in access to health research (p. e19). However, when considering the treatment of Blacks in health research as exemplified by the Public Health Service’s Tuskegee Syphilis experiment on impoverished black men of Macon County, Alabama, from 1932 to 1972, Thomas and Quinn (1991), assert that this blatant example of deplorable medical misconduct, one of many in the history of race relations in the United States, has shaped the attitude of Black Americans towards participation in health research, as conspiracy theories about Whites against Blacks persist, including the belief that AIDS is a form of genocide and that the US government promotes drug abuse in Black communities (p. 1498).

Several aspects of the format of the racial identity item in this online questionnaire must be noted. Given that survey respondents were able to select the option “rather not say” for this questionnaire item, or simply leave it blank, it is conceivable that the number of visible minority respondents is higher than reported in the frequency distribution. Also, the study survey sample was not drawn exclusively from the population of Canada, but also sampled, albeit to a much smaller extent, Americans and Internet users from other countries, as described in section 4.2.1.2 Geographic location.

4.2.1.9 Summary of demographic data

Overall, this study’s survey respondents were highly educated and predominantly single. Although they are predominantly white (Caucasian-European), other racial backgrounds are represented in the study sample. In terms of household income, the sample is evenly split between those with a household income of under $40,000 per year and those with a household income over $40,000 per year. The median income group for this study’s
survey sample is lower than 1996 household incomes in Canada, Ontario, and Toronto, except for sole-female households. While the survey sample in several respects is not representative of the population of Canada as a whole, it is, to a large extent, representative of female Internet users in 2000-2001. Issues of sample representativeness and nonresponse bias are evident in other studies on this topic. According to Pew Institute researcher, Susannah Fox (2008), “Our sample sizes for health surveys have been too small to do in-depth analysis on race/ethnicity and economic status.”

4.2.2 Web demographics

In Section A of this seven-part Web survey questionnaire, there are seven items concerning Internet and Web access, usage and skill level. All questionnaire items and post-study variables were described in the previous chapter, in section 3.4: Definition and Measurement of Variables.

4.2.2.1 Length of Web usage

Two hundred and fifty-seven respondents completed item A1 concerning length of time using the Web. For this ordinal variable, the median is category four, 4-6 years. The frequency distribution indicates that the majority of respondents have been using the Web for 4-6 years (151) while very few respondents have used it for less than a year (4). Sixty respondents have been using the Web for one to three years while 42 respondents have been using the Web for at least seven years. This ordinal variable was recoded as a dichotomous variable (0=less than four years; 1=more than four years). Most respondents (193; 75%) had been online for more than four years. Clearly, the majority of respondents were experienced Web users; they were early adopters of this computer technology.
Similarly, Yoo (2004, pp. 72, 89) asked survey respondents how long they had been using the Internet or Web. In her sample, approximately 26% selected 7 years or more; 38% selected 4-6 years; 32% selected 1-3 years; somewhat more than 2% selected 6-12 months, and only 2% selected less than 6 months. The frequency distributions for this item in the two dissertation survey samples are quite similar; both distributions contain a high proportion of experienced Internet users.

### 4.2.2.2 Web Access

Item A2 examines Web access from several locations: (a) home, (b) work, (c) school/college/university, (d) public library, (e) family member/friend, and (f) other. The number of respondents for each choice is: A2a (258), A2b (235), A2c (215), A2d (216), A2e (224), and A2f (130). Under “Other”, respondents listed Internet/Web/cybercafe (8), hotel (2), airport (2), stores (2); shows (1); clinic settings (1), and husband’s place of work (1). Daily Web access was most common from home (75%) and work (41%). For public library and family member/friend, less than once a month was the most frequently selected option.

An interval variable was calculated as the sum of all options in item A2 (A2AmtAcc). This variable represents total number of Web access locations for each respondent. The mean value for A2AmtAcc is 4.1 (median=4.0; mode=4; sd=1.3; skew=-0.158; kurtosis=-0.276). The frequency distribution indicates 76 respondents have four locations for Web access, 61 respondents have five locations for Web access, and 34 respondents have six locations for Web access. Measures of central tendency are in agreement and skew and kurtosis values are low indicating values are normally distributed. Evidently, survey respondents have several choices concerning Internet connectivity and consequently, access to the Web, including both private and public spaces. It is likely that choice of location for Web access is related to the activities undertaken throughout the day, such as work-related Internet use in an office environment during business
hours and home and library Internet use after work and on weekends. Another factor to consider is the possible relationship between multiple locations for Web access and living in a large urban environment that provides citizens with a stable and universal electronic infrastructure.

In her dissertation study, Yoo (2004, p. 92), asked survey respondents about place of use for health-related Web use. The frequency distribution for this questionnaire item was: at home (76.4%); work (22.4%); public places (<1%), and other (0.4%). By comparison, the overwhelmingly majority of survey respondents for this study chose the first two options, home and work (over 90% each), but also selected public locations, such as public library and school/college/university, in large numbers (over 75% each). This suggests that survey respondents for this study had much more access to the Web than the survey respondents in Yoo’s study. This is a surprising finding because this study was conducted in 2000-2001, while Yoo’s study was conducted in 2003.

4.2.2.3  Internet connection speed

One hundred and ninety-eight respondents completed item A3 concerning Internet connection speed. There are nine options: options 1-5 represent dial-up or low speed connection speeds while options 6-9 represent ISDN, T1, and cable modem, which are forms of high-speed Internet connectivity. The median for this ordinal variable is category 5, 56Kb/sec. This modem speed was the most common modem speed for internal modems found in personal computers at the time this online survey was conducted (November 2000-April 2001). The frequency distribution indicates 28.4% have a 56.6 Kb/sec modem connection while 19.7% have a 4MB cable modem connection. When this ordinal variable is recoded as a dichotomous variable (0=dial-up modem; 1=ISDN or better), 40.5% of respondents have a dial-up connection while 34.5% have a high-speed connection. However, 22.3% selected “Do not know” for this item, indicating they are unaware of their Internet connection speed. The relatively low response rate for this item also supports this supposition.
4.2.2.4  Shared home Internet access

Two hundred and fifty-nine respondents completed Item A4 concerning shared home Internet access. For this dichotomous variable, 158 (61%) respondents selected no, while 101 (39%) respondents selected yes. Thus, slightly more than half of survey respondents did not share their home Internet access with anyone. Given that many of the respondents are single (see section 4.2.1.1.7), this finding seems reasonable.

Item A5 builds on item A4 by asking with whom Internet access is shared: (a) spouse/partner; (b) children; (c) sister; (d) brother, and (e) others. All participants (264) completed (a) through (d), while 262 completed (e). The frequency distribution indicates that respondents were most likely to share their home Internet access with their spouse/partner (39%), children (18%); brother (10%), sister (7%) and others (20%). Those who selected “others” were primarily sharing Internet access with parents or roommates. The category “others” also included siblings, grandchildren, friends, and neighbours.

From item A5, the interval variable A5_SUM was calculated as the sum of all types of individuals with whom home Internet access is shared. The mean value is 1.0 (median=1.0; mode=1; sd=0.81; skew=0.617; kurtosis=1.005) and the frequency distribution reveals that 110 respondents shared their home Internet access with one type of individual, 64 share with two types of individuals, 2 share with three types of individual, and 1 respondent shares with five types of individual. Measures of central tendency are in agreement and skew and kurtosis values are low, indicating values are normally distributed. In this study sample, shared home Internet access is not uncommon and conceivably involves sharing with several types of individuals.
4.2.2.5 Primary uses of the Web

Item A6 examines types of Web uses. The options are: (a) getting information for personal needs; (b) education; (c) shopping/gathering product information; (d) recreation/leisure; (e) work/business, (f) communication with others (including email), and other. Two hundred and sixty-four respondents completed A6a-A6f, while 255 completed A6g, “other”. Over 95% selected personal needs; 81% selected education; 79% selected leisure; 53% selected work/business; 48% selected shopping; 47% selected communication; and 14% selected “other”. Under “other”, participants listed electronic mail/communication (18), research (10), and many other purposes.

From item A6, the interval variable A6_SUM was calculated as the addition of all options for uses of the Web. The mean value is 4.1 (median=4.0; mode=4; SD=1.3; skew=-0.158; kurtosis=-0.276). Measures of central tendency are in agreement and skew and kurtosis values are low indicating values are normally distributed. The frequency distribution is as follows: 1 type of Web use (6); 2 (24); 3 (57); 4 (76); 5 (61); 6 (34), and 7 (5). Clearly, many survey respondents use the Web for several purposes.

Similarly, Yoo (2004, pp. 72, 90) asked survey respondents what kinds of activities they usually do using the Internet or World Wide Web. In her survey sample, 94% selected email and 95% indicated that they used the Internet or Web for any kind of information seeking. Online transactions such as banking, investing, shopping were popular (61%). A smaller number of respondents chose entertainment activities, such as downloading music (19%) and playing games (16%), as well as communication activities, such as Instant Messenger (20%) and online chat (5%). Although the types of online activities are worded somewhat differently in these two dissertation surveys, the distributions are similar: information seeking was by far the predominant online activities while shopping, leisure, and real-time communication activities were also popular online activities.
4.2.2.6 Web self-efficacy

Item A7 examines personal perceptions of ability to effectively use the Web to find information. Web self-efficacy is one of the independent variables in the study survey. Six statements are provided and participants are required to select the most appropriate choice on a Likert scale of 1 (not at all confident) to 5 (completely confident) for each statement. The statements are listed in section 3.4.1.3 on page 80.

Item A7 was completed by 257 respondents. The frequency distribution is as follows: A7a (262); A7b (258); A7c (257); A7d (256); A7e (256), and A7f (255). For A7a, the largest percentage selected fairly confident, for A7b-f the largest percentage selected completely confident.

From item A7, the interval variable A7EffAve was calculated as the average of all ordinal scores for A7 statements. The mean is 4.3 (median=4.4; mode=4.4; SD=0.79; skew=-1.268; kurtosis=1.619). Measures of central tendency are in agreement and skew and kurtosis values are low indicating values are normally distributed.

To distinguish between Web self-efficacy statements that pertain to learning to use a new Web browser without human assistance, compared to statements that cover learning to use a new Web browser with human assistance, two interval variables were created. Factor analysis with principal component analysis of these six statements supports their classification into two groups, although there is a certain amount of overlap between items in factors 1 and 2. WebNPAv represents the average of the ordinal scores for statements a, e, and f (learning to use a new Web browser on one’s own). The mean is 4.1 (median=4.3; mode=5.0; SD=0.88;
WebFPAv represents the average of the ordinal scores for statements b, c, and d (learning to use a new Web browser with human assistance). The mean is 4.4 (median=4.7; mode=5.0; SD=0.78; skew=-1.676; kurtosis=2.944). There is significant deviation from normality for this variable: skew and kurtosis are high, indicating values are clustered on the right side of the curve and the curve is peaked (leptokurtic). Because inferential tests assume normality, negative skew may mitigate against the use of WebFPAv in inferential statistics.

For the women in IT study (Marton and Choo, 2002), all survey respondents rated their computer expertise fairly highly, as follows: intermediate (36%); intermediate/expert (28%), and expert (33%). As well, they rated their Web expertise fairly highly, as follows: intermediate (24%), intermediate/expert (43%), and expert (31%). Almost 50% of respondents had their own home page. In both of these studies, the survey respondents displayed high Web self-efficacy. Given the domain expertise of women in IT professions, it is understandable that their perceptions of IT competence would be high. However, given the lack of IT expertise in the sample of women seeking health information on the Web, it would seem that their high ratings of Web self-efficacy may have been somewhat unrealistic, perhaps based on the length of time they had been online.

4.2.2.7  Summary of Web demographic data

Overall, survey respondents have been online for many years and are confident about their ability to use the Web effectively to find information. Respondents were divided equally between those with low-speed (dial-up) access and high speed access. They accessed the Web from many locations and nearly half of them shared their Internet access with others, primarily but not exclusively, their spouse/partner.
4.2.3 Dependent variable: Intensity of health information seeking on the Web

Section B comprises five items concerning the dependent variable, intensity (frequency) of health information seeking on the Web. These items range in granularity from general to specific. To be specific, the first two items examine the presence or absence of health information seeking on the Web from content-rich websites and from Web-based communication channels, respectively. The last two items examine health information seeking on the Web across all types of Web information sources on a weekly basis and within a Web session, respectively.

4.2.3.1 Basic measures of the intensity of health information seeking on the Web

The first item (B1) asks respondents whether they use the Web to obtain health-related information from content websites. Two hundred and sixty respondents completed this item, of which 234 selected yes and 26 selected no. That 26 respondents selected “no” is rather unusual since one of the criteria for participating in the Web survey was the use of the Web to find health information. In other words, no one should have selected this option.

Respondents were also asked to list the health websites they most frequently visit. An interval variable was calculated as the sum of all health websites listed by each respondent. The average number of health websites visited is 2.5 (median=2.0; mode=1; sd=1.9; skew=2.009; kurtosis=5.419). Deviation from the normal distribution is quite pronounced; the values for skew and kurtosis are high. The frequency distribution indicates 79 respondents listed one health website; 52 listed two health websites; 25 listed three health websites, 20 listed four health websites, and up to 12 websites were listed by two respondents.
What kinds of health websites do survey respondents visit? Many respondents listed large, multi-topic, American-based consumer health websites (portal sites) such as WebMD and OnHealth. MedBroadcast, a Canadian health portal site under the ownership of media giant CanWest Global, is also popular. PubMed, the Web searchable interface to MEDLINE bibliographic database of health journal literature was also frequently listed, although, strictly speaking, it is not a health website, but an electronic resource predominantly used by medical librarians to search the health sciences and medical journal literature. Also popular were health websites developed by not-for-profit organizations such as the Heart and Stroke Foundation, which focus on one area of health, for example, cardiovascular health. Single-topic health websites such as Something Fishy, a site that focuses on eating disorders, are popular. While women’s health websites are listed by some respondents, such as the Canadian Women’s Health Network and Women’s Health Matters, they do not appear frequently in this sample. Listed with lesser frequency are the websites of medical journals such as the British Medical Journal, the Journal of the American Medical Association, the Canadian Medical Association Journal, and the New England Journal of Medicine, among others. Mass media news and entertainment channels, such as the online Toronto Star and Oprah Winfrey’s Oxygen also received some notice.

Warner and Procaccino (2007) provided survey respondents in their study with a list of 25 health information websites based in the United States instead of asking them to list their most frequently visited consumer health information websites. Their list included such well known general, multi-topic consumer health information websites as the Mayo Clinic and MEDLINEplus, as well as women’s health specific sites, such as the National Women’s Health Network and the National Women’s Health Information Center,
and also authoritative health websites not intended primarily for the public, such as ClinicalTrials.gov and the National Center for Health Statistics. Survey respondents were asked to rank these sites by awareness. The Mayo Clinic was the top ranked site for Web users, followed by the U.S. Food and Drug Administration, Centers for Disease Control and Prevention, Office of the Surgeon General, and U.S. Department of Health and Human Services, individual drug/pharmaceutical company websites, National Institutes of Health, USDA: Nutrition and Your Health: Dietary Guidelines for Americans, Merck Manual of Medical Information, National Institute of Mental Health, in the top 10. The order of awareness of these health information websites differed for non-Web users, but the top ten list compiled by this group was similar to that of the Web users.

There are several interesting findings, namely, the top ranked websites are multi-topic websites and are primarily government health department websites, not consumer health information websites per se. Also, awareness of women’s health information websites was lower than for government sites and the Mayo Clinic, ranking below the top 10. These findings concerning awareness of health information websites in Warner and Procaccino’s study are comparable to this study: both survey samples of women seeking health information chose multi-topic sites to a greater extent than women’s health sites, and were aware of MEDLINEplus.

Because some respondents listed search engines instead of, or in addition to health websites, a dichotomous variable was created that represents the presence or absence of search engines listed in the first item. Although 164 respondents (78.5%) did not list search engines, 45 respondents (21.5%) listed one or more general Web search engines. Google and Yahoo! were the most frequently listed Web search engines.
The popularity of these two general Web search engines in this study sample is supported by similar findings from large-scale surveys of Canadian Internet Users conducted by the Canadian Internet Project (Zamaria and Fletcher, 2007), Ipsos-Reid (2008), and comScore (2004). Launched in 2003, comScore qSearch tracks usage of Web search engines. Using this analytical tool, comScore (2004) found that Canadians are more active users of Web search engines than Americans, with approximately 85% of Canadian Internet users undertaking at least one search at the top Web search engines each month, compared to 73% of American Internet users. Moreover, Canadian Internet users search more frequently than American Internet users. Also, at that time, Google accounted for 62% of all searches by Canadian Internet users, whereas in the United States, Google and Yahoo! had similar market share.

The second item (B2) is a dichotomous variable that asks respondents if they use the Web to communicate with others or ask others questions about health, apart from personal email. Two hundred and sixty-one respondents answered this item, of which 169 selected no (65%) and 92 selected yes (35%). Thus, close to two thirds of survey respondents do not use the Web to communicate with others or ask others questions about health. As with the first item, respondents were also asked to list the health communication sources they frequently visit. The number of sources was counted and an interval variable was created that captures, the total number of sources listed. The average number of Web communication sources visited is 1.4 (median=1.0; mode=1; sd=0.6; skew=1.464; kurtosis=1.204). The distribution is positively skewed: the majority of values fall on the left side of the distribution and the long tail is on the right side of the distribution. The frequency distribution shows 55 (21%) listed one source; 19 (7.2%) listed two sources and 4 (1.5%) listed three sources. However, 186 respondents did not list any Web-based communication sources, suggesting a preference for visiting content websites.
The most frequently listed type of Web-based communication was listservs, followed by newsgroups, bulletin boards, and chatrooms. A few respondents listed egroups, ICQ, website email advice, and instant messenger services. Very few participants were able to identify specific CMC sources. However, the following newsgroups were mentioned: alt.support.arthritis; alt.support.fibromalagia; alt.support.mult-sclerosis; alt.support.menopause, and sci.med.cardiology, among others. Also mentioned were the MedBroadcast bulletin boards; chatrooms for www.healthdiscovery.net and fertilityfriend.com, and listservs from CATIE, Planned Parenthood, ACOR, Ontario Women’s Health Network, the Ontario Prevention Clearinghouse, the majority of which serve healthcare professionals.

The third item (B3) is a dichotomous variable that asked respondents if they use the Web on a weekly basis; it is a frequency of Web use variable. Two hundred and sixty-two respondents completed this item, of which 148 (56.5%) selected no and 114 (43.5%) selected yes. Thus, slightly more than half of survey respondents did not use the Web to obtain health-related information on a weekly basis. This suggests that Web use for health information seeking may occur less frequently, perhaps on a monthly basis or as the need arises.

4.2.3.2 Ordinal measures of the intensity of health information seeking on the Web

4.2.3.2.1 Hours per week

The fourth item (B4) is an ordinal variable that asks respondents how many hours per week in total they spend on the Web looking for health information. Five types of Web-based information sources are listed: (a) website content; (b) web-based search engine; (c) web-based bulletin board or chatroom; (d) listserv/newsgroup, and (e) “other”.
Respondents were asked to select from the ordinal options: never; less than 1; 1-2; 3-5; 6-10, and over 10.

<table>
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<tr>
<th>Descriptive Statistics</th>
<th>Use of Web in hours per week to obtain health information from: Content Websites</th>
<th>Use of Web in hours per week to obtain health information from: Web-based CMC: Bulletin Boards/ Chatrooms</th>
<th>Use of Web in hours per week to obtain health information from: Web-based CMC: Listservs/ Newsgroups</th>
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</tbody>
</table>

Table 4.2: Descriptive statistics for the dependent variable: Frequency of seeking health information on the Web (3 facets)

The frequency distributions for these five Web-based information sources indicates the majority of respondents spent two or less than two hours viewing website content (47%) and less than an hour using Web search engines (30%). Somewhat more than half (57%) of respondents never use Web-based computer-mediated channels. The Web-based CMC variants of this ordinal-level questionnaire item display unbalanced cell sizes, demonstrating a non-normal distribution.
In table 4.2 above, the descriptive statistics for three of the five versions of this six-category ordinal-level dependent variable that are utilized for model and hypothesis testing are summarized, including appropriate measures of central tendency (median, mode); measures of dispersion (range, inter-quartile range), and measures of normality (skew and kurtosis). For the dependent variable, Web-based CMC (Bulletin Boards/Chatrooms), skew is greater than 0, demonstrating the right tail is longer than the left tail. As well, kurtosis is greater than 3, demonstrating a strong peak for this distribution.

The dependent variable is further investigated by examining the frequency distributions for the three facets of the Web. The valid percent (instead of actual frequency and percent) are presented for each of the six categories in Table 4.3 on the next page. Not shown are the number of missing cases, which ranged from 86 to 91.

In Table 4.3 below, the valid percent data for each of the three facets of the dependent variable is compared. It is evident that a substantial number of survey respondents (approximately 60%) did not use either type of Web-based CMC. Those that did so were infrequent users, selecting less than 1 hour per week or 1-2 hours per week. These categories were also selected for the websites facet of the dependent variable, frequency of seeking health information on the Web, FSHIW.

<table>
<thead>
<tr>
<th>Valid Percent</th>
<th>Use of Web in hours per week to obtain health information from:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Content Websites</td>
<td>Web-based CMC: Bulletin Boards/Chatrooms</td>
</tr>
<tr>
<td>Never</td>
<td>4.5</td>
<td>57.8</td>
</tr>
<tr>
<td>Less than 1 hour</td>
<td>35.4</td>
<td>26.6</td>
</tr>
<tr>
<td>1-2 hours</td>
<td>33.1</td>
<td>6.4</td>
</tr>
<tr>
<td>3-5 hours</td>
<td>13.5</td>
<td>4.0</td>
</tr>
<tr>
<td>6-10 hours</td>
<td>7.3</td>
<td>2.3</td>
</tr>
<tr>
<td>Over 10 hours</td>
<td>6.2</td>
<td>2.9</td>
</tr>
</tbody>
</table>
Table 4.3: Frequency distributions for the three facets of the dependent variable, FSHIW

4.2.3.2.2 Hours per session

Item five (B5) is an ordinal variable of finer granularity than item 4. It asks respondents how many hours in total they spend on the Web looking for health information during a typical Web session for health information seeking. The same five types of Web-based information sources are listed as for item four. The ordinal options for this item are: never; less than 1; 1-2; 3-4; 5-6, and over 6. The frequency distributions for these five Web-based information sources indicates the majority of respondents spend two hours, or less than two hours, viewing website content (54%) and less than an hour using Web search engines (55%). The majority of respondents have never used web-based communication sources. These findings parallel those described above for the dependent variable measured in terms of use of Web in hours per week. The finer granularity of this measure of the dependent variable precluded its use in model and hypothesis testing.

4.2.4 Frequency of health Web use: comparisons to other studies

In her dissertation survey, Yoo (2004, pp. 70-72, 89) asked respondents about their frequency of Internet or Web use, in general, which was captured as both a dichotomous variable and as an ordinal variable. These items were classified as non-theoretical variables. In her survey sample, Internet and Web users comprised 86.3% of respondents, while non-users comprised 13.7% of respondents. In terms of frequency of use, almost 40% used the Internet or Web more than once a day; slightly more than 29% used the Internet or Web almost every day; approximately 15% used the Internet or Web
3-5 times a week; 9.4% of respondents used the Internet or Web 1-2 times a week, 4% used the Internet or Web a few times a month, and 2% used the Internet or Web less than once a month. Clearly, Yoo’s dissertation survey sample featured a large number of frequent Internet and Web users.

In Warner and Procaccino’s study (2004), 85% of survey respondents reported having used the Web for any purpose, with almost two thirds having used the Web either daily or a few times a week, and somewhat less than 25% having used the Web once a week or less, and nearly 16% having never used the Web for any purpose. Thus, this survey study is also characterized by a large number of frequent Web users.

Participants in Leung’s telephone survey (2008) were less likely to be Internet users. From a sample of 1076, almost 53% were Internet users while 47% were non-users. While Internet usage intensity was examined in relation to specific online activities and Web technologies, such as Web search, online news, e-mail, instant message (ICQ, MSN), blogs, and forums, descriptive statistics on this set of variables was not provided. The large number of non-Internet users is surprising given that this study was conducted in 2006, and that it sampled a predominantly Asian population.

For the women in IT study (Marton and Choo, 2002), the World Wide Web was the most frequently used type of information source and computer-mediated communication was the fourth most frequently used type of information source. However, the Intranet/Portal (internal Web) was the eighth ranked type of information source by frequency of use, which was surprising given that this type of information source should offer the most specialized and relevant information to IT workers.
Yoo (2004, pp. 70-72, 92) also asked survey respondents about their frequency of Internet or Web use for health-related Web use. This question was posed as a dichotomous variable and as two ordinal variables (how often, how long). These items comprised the study variable, Past Experience with health-related Web use (PE). The dependent variable, it should be noted, did not measure actual Web use but rather, behavioural intention to use health-related websites (in the next three months).

A clear majority of survey respondents (80%) in Yoo’s study (2004) used the Internet or Web for health-related uses. By comparison, the percentage of survey respondents who used the Internet or Web to find health or medical information is smaller (64.3%). With respect to frequency of use item in Yoo’s study, 39% selected less than once a month; 38% selected a few times a month; 12.5% selected 1-2 times a week; 4% selected 3-5 times a week; 5% selected almost every day, and less than 1% selected more than once a day. The frequency distribution for this item, frequency of Web use for health uses, is almost the inverse of the frequency distribution for general Internet or Web use. With respect to amount of use, approximately 63% selected less than 30 minutes; 32% selected about an hour, while only 4.6% selected 1-2 hours, and less than 1% selected longer than 2 hours. Clearly, although respondents in Yoo’s survey sample were frequent users of the Internet and Web in general, they did not use the Web frequently or for extended periods of time, to seek health information online.

This finding of infrequent use of the Internet to look for health or medical information is consistent with Pew Institute studies on seeking health information online (Fox and Rainie, 2002; Fox and Fallows, 2003), as Yoo noted (p. 94). In these two Pew studies, only 5-6% of Internet users sought health or medical information online on a typical day,
while approximately 80% went to the Internet for health information every few months or less. In this study, somewhat more than half of survey respondents did not use the Web to obtain health-related information on a weekly basis. Thus, the infrequent use of the Web to find health information online was not unique to this study, but has been consistently found in survey studies of this behavior.

4.3 Perceptions of information source characteristics

Section C of this Web survey examines respondents’ perceptions of information source quality and accessibility. Although not readily apparent to survey respondents, the information sources were grouped according to media format. Internet-based information sources comprised: (a) websites, (b) web-based bulletin boards or chatrooms, and (c) listservs/newsgroups. Print-based information sources comprised: (d) pamphlets or fact sheets, (e) newspapers or magazines, (f) books. Electronic media information sources comprised: electronic mass media (g) television programs, (h) radio programs, (i) videos, and (j) CD-ROMs. Lastly, interpersonal information sources included: (k) family members or friends, (l) librarians, and (m) healthcare practitioners. Respondents were able to identify additional information sources by selecting (n) and (o) for other sources.

4.3.1 Perceptions of information source accessibility

Two attributes of accessibility were examined. For each item, participants indicated their responses on ascending 5-point Likert scales. The first item (C1) pertains to what can be considered to be the first stage of information source access; time and effort required to approach, contact, or locate each information source, and primarily captures physical access. The second item (C2) describes the second stage of access, referred to as cognitive access; the ease with which information can be retrieved from an information source. This dimension of perceived information source accessibility takes into consideration cognitive ability, literacy, and information retrieval skills.
For the first item, the response rate varied across information sources, as follows: websites (261), web-based bulletin boards/chatrooms (169), listservs (164), pamphlets or fact sheets (241), newspapers or magazines (251), books (249), television programs (227), radio programs (191), videos (190), CD-ROMs (166), family members or friends (240), librarians (196), healthcare practitioners (245), and other sources1 (9), and other sources2 (3).

The highest non-response is seen with these information sources: Web-based communication, CD-ROMs, and “other”. The frequency distributions for these types of information sources show that the majority of respondents chose the options: “some”, “little”, or “very little”, when rating their accessibility. Healthcare practitioners received the highest percentage of the ratings, “a lot” and “a great deal”, indicating they are perceived to be the most difficult information source to access. The least difficult information sources, in terms of physical access, are websites and family and friends. This would seem to indicate two things: the close physical proximity of a computer with Internet access and the embeddedness of individuals in their primary social network.

<table>
<thead>
<tr>
<th>Valid Percent</th>
<th>Perception of the amount of time and effort needed to approach, contact, or locate health information from the Web:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Content Websites N=261</td>
</tr>
<tr>
<td></td>
<td>Web-based CMC: Bulletin boards/ Chatrooms N=169</td>
</tr>
<tr>
<td></td>
<td>Web-based CMC: Listservs/Newsgroups N=164</td>
</tr>
<tr>
<td>Very little</td>
<td>33.3</td>
</tr>
<tr>
<td>Little</td>
<td>29.1</td>
</tr>
<tr>
<td>Some</td>
<td>24.9</td>
</tr>
<tr>
<td>A lot</td>
<td>9.6</td>
</tr>
<tr>
<td>A great deal</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Table 4.4: Frequency distribution for perception of physical access to the Web as a source of health information
The frequency distribution of the first type of information source access is presented in Table 4.4 above. The relative proportion of respondents in the five categories, for each of the three facets of the Web, is fairly similar. Approximately 80% of respondents do not experience obvious difficulty accessing the Web for the purpose of finding health information.

For the second item, cognitive access (C2), response rate was once again quite variable, as follows: websites (259), web-based bulletin boards or chatrooms (141), listservs or newsgroups (140), pamphlets or fact sheets (244), newspapers or magazines (242), books (242), television programs (216), radio programs (173), videos (170), CD-ROMs (143), family members or friends (229), librarians (166), healthcare practitioners (241), othersources1 (7), and othersources2 (1).

The highest non-response rate was observed for the following types of information sources: Web-based communication, electronic sources, librarians, and other. The frequency distributions for these information sources indicate the majority of respondents chose these options: “very easy”, “easy”, or “neither easy nor difficult” for almost all information sources. Websites, pamphlets/fact sheets and family members or friends receive the highest percentage of the rating “very easy”. Radio programs received the highest percentage of “difficult” ratings, in all likelihood because individuals cannot retrieve health information from radio programs merely by turning on the radio: they must have a schedule of radio programs and an understanding of which shows will cover their health issues at any given moment in time, in order to efficiently and effectively retrieve information from this medium. Healthcare practitioners received the second highest percentage of “difficult” and “very difficult” scores, indicating they are perceived to be the most difficult information source to access, according to this measure of accessibility. This may be related to the difference in medical knowledge
between health care practitioners, who are experts, and respondents, who are more representative of the general public. It may also be related to the tendency of healthcare practitioners to employ medical jargon in their communication with patients and the public at large.

<table>
<thead>
<tr>
<th>Valid Percent</th>
<th>Perception of the ease of getting health information from the Web, in terms of ease of navigation and readability (cognitive access)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Content Websites N=259</td>
</tr>
<tr>
<td>Very easy</td>
<td>27.0</td>
</tr>
<tr>
<td>Easy</td>
<td>44.4</td>
</tr>
<tr>
<td>Neither easy nor difficult</td>
<td>20.8</td>
</tr>
<tr>
<td>Difficult</td>
<td>5.0</td>
</tr>
<tr>
<td>Very difficult</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Table 4.5: Frequency distribution for perception of cognitive accessibility of the Web as a source of health information

The frequency distribution of the second type of perceived information source accessibility is presented in Table 4.5 above. The proportion of respondents in the five categories for each of the three conceptualizations of the Web differs substantially. Specifically, more respondents found it easier to obtain health information from the Web from content websites than from Web-based CMC information sources, with the lowest number of respondents rating the cognitive access of Web-based CMC: Listservs/Newsgroups as “very easy” or “easy”. Perhaps the subscription process associated with this form of Web-based CMC acts as a barrier to individuals seeking health information online. Some listservs and newsgroups are moderated, which may also present a barrier to active participation.
4.3.2 Perceptions of information source quality

Two attributes of information source quality (relevance and reliability) were examined. For each item, participants indicated their responses on ascending 5-point Likert scales. Item C3 describes perceived information source relevance in terms of comprehensiveness, timeliness, and usefulness. Item C4 operationalizes perceived information source reliability in terms of authoritativeness, credibility, and dependability.

The response rate for C3 (perceived information source relevance) varied across types of information sources as follows: websites (260), web-based bulletin boards or chatrooms (143), listservs or newsgroups (142), pamphlets or fact sheets (246), newspapers or magazines (242), books (237), television programs (221), radio programs (117), videos (174), CD-ROMs (145), family members or friends (234), librarians (166), healthcare practitioners (233), other sources1 (9), and other sources2 (0).

Web-based CMC, radio programs, and CD-ROMS received the highest non-response rate, suggesting that many respondents did not use these information sources for the purpose of seeking health information. Measures of central tendency and the frequency distribution of C3 (perceived information source relevance) reveal the highest rated sources of health information were healthcare practitioners (122 out of 233 respondents assigned healthcare practitioners a rating of 5 - very relevant, followed by books and websites (mean=3.9 for both sources), and pamphlets or fact sheets (mean = 3.7). The lowest rated sources of health information were web-based bulletin boards and chat rooms (mean = 3.2) and listservs and newsgroups (mean = 3.3). However, about 50% of respondents did not assign ratings to these two types of information sources, indicating that web-based communication channels are not used as much as content websites for the purpose of finding health information. The within-subjects effects F-test (Huynh-Feldt correction) for repeated measures analysis of variance is significant at 0.000 (less than 0.0005) indicating that differences in means
are statistically significant and reflective of respondents’ ability to rate their perception of the relevance of health information from each information source in relation to other information sources.

Of some concern to the profession of librarianship, is the finding that librarians received the same mean rating for relevance as non-professionals, namely, family members and friends, instead of being rated as highly as healthcare practitioners. It is not clear what one can infer from this finding given that type of librarian was not specified. Consumer health and medical librarians possesses some degree of health domain knowledge, albeit not equal to that of healthcare providers, while other types of librarians are not experts in this domain. One cannot infer from survey respondents’ ratings that the public does not rely on librarians as a source of health information, despite their qualifications as information professionals. However, it is interesting to note that the information source type, internal library/information centres, in the women in IT study, did not receive high ratings (Marton and Choo, 2002). These types of libraries are staffed by librarians with specialized training in business information sources. The specialized training of corporate librarians and the specialized corporate collections in the corporate library/information centre were not given appropriate recognition by women in IT professions seeking information about IT for their work.

<table>
<thead>
<tr>
<th>Valid Percent</th>
<th>Perception of the relevance of health information on the Web</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very irrelevant</td>
<td>5.4</td>
</tr>
<tr>
<td>Fairly irrelevant</td>
<td>5.0</td>
</tr>
<tr>
<td>Of some relevance</td>
<td>20.8</td>
</tr>
<tr>
<td>Fairly relevant</td>
<td>36.9</td>
</tr>
<tr>
<td>Very relevant</td>
<td>31.9</td>
</tr>
</tbody>
</table>

Table 4.6: Frequency distribution for perception of the relevance of the Web as a source of health information
The frequency distribution of relevance rankings for the Web as a source of health information is presented in Table 4.6 above. The proportion of respondents in the five categories for each of the three facets of the Web differs substantially at both ends of the Likert scale. Content websites engender the highest ratings of perceived information source relevance for the Web as a source of health information, whereas Web-based CMC sources receive the lowest ratings of perceived information source relevance. Conversely, Web-based CMC channels received the most ratings of low perceived information source relevance, in particular, listservs or newsgroups. Web-based CMC channels also received the most intermediate ratings of perceived information source relevance, and approximately one-third of respondents rated Web-based CMC channels as “of some relevance”, in contrast to only 21% for content websites.

Respondents’ ratings of the perceived reliability of information sources (C4) follow a similar order as ratings observed for perceived information source relevance. The range of ratings for most information sources fell between somewhat reliable and fairly reliable. Healthcare practitioners are ranked highest: 150 of 248 respondents rated health information provided by healthcare practitioners as very reliable and the mean rating was 4.5 out of 5. The next highest rated type of information source was books (4.1), followed by pamphlets or fact sheets (4.0). The lowest rated information sources were web-based bulletin boards and chatrooms (2.9) and listservs or newsgroups (3.1). Websites received slightly higher ratings (3.6) for reliability than librarians (3.5).
The within-subjects repeated-measures ANOVA, with Huynh-Feldt correction, indicates differences in means are significant at 0.000 (less than 0.0005). Approximately 40% of respondents selected “don’t know” for Web-based BB/chatrooms and listservs/newsgroups, which seems to indicate they don’t make use of these information sources for the purpose of seeking health information. A summary of measures of central tendency for questionnaire items on information source quality is provided in Table 4.7 above.

Mean rankings of health information sources from Likert-scaled items in section C of the Web survey indicate health websites received fairly high ratings for perceived information source relevance (3.9). Only healthcare practitioners received higher ratings (4.2). In terms of perceived information source reliability, health websites rated lower (3.6) than healthcare practitioners (4.5), books (4.1), and pamphlets and fact sheets (4.0). However, the mean reliability rating for health websites is on par with mean reliability ratings for librarians,
CD-ROMs, videos, and newspaper and magazines. This finding suggests health websites are generally perceived as offering highly relevant and fairly reliable health information, when compared to other sources of health information.

The frequency distribution of reliability rankings for the Web as a source of health information is presented in Table 4.8 below. The proportion of respondents in the five categories for each of the three conceptualizations of the Web differs substantially at both ends of the Likert scale. However, it is clear that less than ten percent of respondents gave the lowest ratings, “very unreliable”. Content websites received twice as many of the highest ratings of perceived information source reliability for the Web as a source of health information, whereas Web-based CMC channels received three times as many of the lowest ratings of reliability, “very unreliable”. Web-based CMC channels received the most ratings of intermediate reliability, “somewhat reliable”.

<table>
<thead>
<tr>
<th>Valid Percent</th>
<th>Perception of the reliability of health information on the Web</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Website content: N=258</td>
</tr>
<tr>
<td></td>
<td>Web-based CMC: Bulletin Boards/Chatrooms: N=149</td>
</tr>
<tr>
<td></td>
<td>Web-based CMC: Listservs/Newsgroups: N=147</td>
</tr>
<tr>
<td>Very unreliable</td>
<td>2.7</td>
</tr>
<tr>
<td>Unreliable</td>
<td>3.9</td>
</tr>
<tr>
<td>Somewhat reliable</td>
<td>35.7</td>
</tr>
<tr>
<td>Fairly reliable</td>
<td>43.0</td>
</tr>
<tr>
<td>Very reliable</td>
<td>14.7</td>
</tr>
</tbody>
</table>

Table 4.8: Frequency distribution for perception of the reliability of the Web as a source of health information

4.3.3 Relationships between information sources and differences within information sources

4.3.3.1 Correlations for perceived information source accessibility

A non-parametric (Spearman) correlation matrix was computed for perceived information source accessibility. The thirteen types of information sources, for which there are two
measures of access per information source (physical access, cognitive access), are correlated with each other to generate a 676-cell correlation matrix.

<table>
<thead>
<tr>
<th>No.</th>
<th>Strength</th>
<th>2-tailed sign.</th>
<th>N</th>
<th>Information Source 1</th>
<th>Information Source 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Electronic Sources</strong></td>
<td><strong>Electronic Sources</strong></td>
</tr>
<tr>
<td>1</td>
<td>0.87</td>
<td>0.000</td>
<td>171</td>
<td>Cognitive Access: Radio programs</td>
<td>Cognitive Access: Television programs</td>
</tr>
<tr>
<td>2</td>
<td>0.72</td>
<td>0.000</td>
<td>183</td>
<td>Physical Access: Radio programs</td>
<td>Physical Access: Television programs</td>
</tr>
<tr>
<td>3</td>
<td>0.69</td>
<td>0.000</td>
<td>167</td>
<td>Physical Access: Videos</td>
<td>Physical Access: Radio Programs</td>
</tr>
<tr>
<td>4</td>
<td>0.69</td>
<td>0.000</td>
<td>161</td>
<td>Cognitive Access: Videos</td>
<td>Cognitive Access: Television Programs</td>
</tr>
<tr>
<td>5</td>
<td>0.67</td>
<td>0.000</td>
<td>144</td>
<td>Cognitive Access: Videos</td>
<td>Cognitive Access: Radio Programs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Internet</strong></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0.650</td>
<td>0.000</td>
<td>146</td>
<td>Physical Access: Listservs/Newsroups</td>
<td>Physical Access: Web-based BB/Chat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Print</strong></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0.650</td>
<td>0.000</td>
<td>232</td>
<td>Physical Access: Newspapers/Magazines</td>
<td>Physical Access: Pamphlets/Factsheets</td>
</tr>
<tr>
<td>8</td>
<td>0.632</td>
<td>0.000</td>
<td>242</td>
<td>Physical Access: Books</td>
<td>Physical Access: Newspapers/Magazines</td>
</tr>
<tr>
<td>9</td>
<td>0.621</td>
<td>0.000</td>
<td>234</td>
<td>Cognitive Access: Books</td>
<td>Cognitive Access: Newspapers/Magazines</td>
</tr>
</tbody>
</table>

**Table 4.9:** Robust and significant correlations for perceived information source accessibility

There is a pattern of strong (>0.70) and moderate (0.40 – 0.69) correlations within an information source category, for example, two types of Internet information sources, when the measure of perceived information source accessibility is the same. The ranking of the largest and most significant correlations are listed in Table 4.9 above.
The largest and highly significant correlations are from the electronic sources category. There are robust correlations from the Internet and from the print categories of information sources. However, there are no strong correlations within the interpersonal category. Perhaps this is not surprising given that the interpersonal category contains the most heterogeneous collection of information sources: family and friends, healthcare practitioners, and librarians. Many individuals would not view health information obtained from these three interpersonal sources as equivalent in quality or accessibility. Interesting to note, websites have the largest number of weak correlations. Correlations between different categories of information sources are, at best, of modest size and significance.

<table>
<thead>
<tr>
<th>Type of Information Source</th>
<th>N</th>
<th>T</th>
<th>df</th>
<th>2-tailed sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Content Websites</td>
<td>257</td>
<td>2.969</td>
<td>256</td>
<td>0.003</td>
</tr>
<tr>
<td>2 Web-based bulletin boards and chatrooms</td>
<td>134</td>
<td>3.523</td>
<td>133</td>
<td>0.001</td>
</tr>
<tr>
<td>3 Web-based listservs and newsgroups</td>
<td>135</td>
<td>1.825</td>
<td>134</td>
<td>0.070</td>
</tr>
<tr>
<td>4 Pamphlets and fact sheets</td>
<td>239</td>
<td>-4.918</td>
<td>238</td>
<td>0.000</td>
</tr>
<tr>
<td>5 Newspapers and magazines</td>
<td>238</td>
<td>-1.524</td>
<td>237</td>
<td>0.129 (NS)</td>
</tr>
<tr>
<td>6 Books</td>
<td>229</td>
<td>-3.172</td>
<td>228</td>
<td>0.002</td>
</tr>
<tr>
<td>7 Television programs</td>
<td>209</td>
<td>-1.778</td>
<td>208</td>
<td>0.077 (NS)</td>
</tr>
<tr>
<td>8 Radio programs</td>
<td>169</td>
<td>-2.778</td>
<td>168</td>
<td>0.006</td>
</tr>
<tr>
<td>9 Videos</td>
<td>162</td>
<td>-2.311</td>
<td>161</td>
<td>0.022</td>
</tr>
<tr>
<td>10 CD-ROMS</td>
<td>135</td>
<td>-3.268</td>
<td>134</td>
<td>0.001</td>
</tr>
<tr>
<td>11 Family members and friends</td>
<td>229</td>
<td>2.685</td>
<td>151</td>
<td>0.000</td>
</tr>
<tr>
<td>12 Librarians</td>
<td>151</td>
<td>-0.869</td>
<td>150</td>
<td>0.386 (NS)</td>
</tr>
<tr>
<td>13 Healthcare practitioners</td>
<td>230</td>
<td>-3.886</td>
<td>229</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 4.10: Summary of paired t-tests for perceptions of information source accessibility

Another approach to understanding respondents’ perceptions of the accessibility of information sources is to compare mean values for the two measures of perceived information source accessibility for each type of information source using paired t-tests. The results of these paired t-test comparisons are summarized in table 4.10 above.
Respondents are able to distinguish between the two measures of perceived information source accessibility for nearly all types of information sources, with the exception of newspapers and magazines, television programs, and librarians.

4.3.3.2 Correlations for perceived information source quality

A non-parametric (Spearman) correlation matrix was computed for perceived information source quality. The thirteen information sources, for which there are two types of quality (relevance, reliability) per information source, are correlated with each other to generate a 676-cell correlation matrix. There is a pattern of strong (0.70 and larger) and moderate (0.40 – 0.69) correlations within an information source category, for example, two types of Internet information sources, when the measure of perceived information source quality is the same. The ranking of the largest and most significant correlations are listed in Table 4.11 on the next page.

There are two robust and highly significant correlations for three out of four information source categories. There are no strong correlations within the interpersonal category. In fact, the largest number of weak correlations is seen for interpersonal sources. Correlations between different categories of information sources generate, at best, moderate size correlations, among them:

- 0.60 (sign. 0.000; N: 212) Reliability: Television and Newspaper/Magazine
- 0.58 (sign. 0.000; N: 171) Relevance: Videos and Pamphlets/Factsheets
- 0.57 (sign. 0.000; N: 167) Reliability: Videos and Pamphlets/Factsheets
- 0.52 (sign. 0.000; N: 169) Relevance: Videos and Books
- 0.51 (sign. 0.000; N: 165) Relevance: Videos and Reliability: Books
<table>
<thead>
<tr>
<th>No.</th>
<th>Strength</th>
<th>2-tailed sign.</th>
<th>N</th>
<th>Information Source 1</th>
<th>Information Source 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.80</td>
<td>0.000</td>
<td>168</td>
<td>Reliability: Radio programs</td>
<td>Reliability: Television programs</td>
</tr>
<tr>
<td>2</td>
<td>0.74</td>
<td>0.000</td>
<td>167</td>
<td>Relevance: Videos</td>
<td>Relevance: Television programs</td>
</tr>
<tr>
<td>3</td>
<td>0.72</td>
<td>0.000</td>
<td>122</td>
<td>Relevance: Listserv/Newsgroup</td>
<td>Relevance: Web BB/Chat</td>
</tr>
<tr>
<td>4</td>
<td>0.72</td>
<td>0.000</td>
<td>129</td>
<td>Reliability: Listserv/Newsgroup</td>
<td>Reliability: Web BB/Chat</td>
</tr>
<tr>
<td>5</td>
<td>0.61</td>
<td>0.000</td>
<td>234</td>
<td>Relevance: Newspapers/Magazines</td>
<td>Relevance: Pamphlets/Factsheets</td>
</tr>
<tr>
<td>6</td>
<td>0.66</td>
<td>0.000</td>
<td>231</td>
<td>Relevance: Books</td>
<td>Relevance: Newspapers/Magazines</td>
</tr>
</tbody>
</table>

Table 4.11: Robust and significant correlations for perceived information source quality

Averaged measures of quality for each information source are used to generate a 13x13=169 cell matrix. A similar pattern emerges: the largest and most significant correlations fall within the electronic information sources group and within the Internet-based information sources group. The largest number of moderate correlations occurs between print information sources and electronic information sources.

Another approach to understanding respondents’ perceptions of the quality of information sources is to compare mean values for perceived information source relevance and perceived information source reliability for each type of information source using paired t-tests. The results of these paired t-test comparisons are summarized in table 4.12 on the next page.
<table>
<thead>
<tr>
<th>Type of Information Source</th>
<th>N</th>
<th>T</th>
<th>df</th>
<th>2-tailed sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Content Websites</td>
<td>258</td>
<td>0.981</td>
<td>257</td>
<td>0.328 (NS)</td>
</tr>
<tr>
<td>2 Web bulletin boards and chat rooms</td>
<td>135</td>
<td>-0.071</td>
<td>134</td>
<td>0.943 (NS)</td>
</tr>
<tr>
<td>3 Web listservs and newsgroups</td>
<td>135</td>
<td>-0.325</td>
<td>134</td>
<td>0.746 (NS)</td>
</tr>
<tr>
<td>4 Pamphlets and fact sheets</td>
<td>234</td>
<td>8.367</td>
<td>233</td>
<td>0.000</td>
</tr>
<tr>
<td>5 Newspapers and magazines</td>
<td>235</td>
<td>2.230</td>
<td>234</td>
<td>0.027</td>
</tr>
<tr>
<td>6 Books</td>
<td>238</td>
<td>5.579</td>
<td>237</td>
<td>0.000</td>
</tr>
<tr>
<td>7 Television programs</td>
<td>207</td>
<td>1.141</td>
<td>206</td>
<td>0.255 (NS)</td>
</tr>
<tr>
<td>8 Radio programs</td>
<td>161</td>
<td>0.731</td>
<td>160</td>
<td>0.466 (NS)</td>
</tr>
<tr>
<td>9 Videos</td>
<td>153</td>
<td>3.794</td>
<td>152</td>
<td>0.000</td>
</tr>
<tr>
<td>10 CD-ROMS</td>
<td>132</td>
<td>3.817</td>
<td>131</td>
<td>0.000</td>
</tr>
<tr>
<td>11 Family members and friends</td>
<td>222</td>
<td>-0.609</td>
<td>221</td>
<td>0.543 (NS)</td>
</tr>
<tr>
<td>12 Librarians</td>
<td>159</td>
<td>1.005</td>
<td>158</td>
<td>0.316 (NS)</td>
</tr>
<tr>
<td>13 Healthcare practitioners</td>
<td>234</td>
<td>7.762</td>
<td>233</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 4.12: Summary of paired t-tests for perceived information source quality

Respondents were able to distinguish between the two measures of quality of information sources for print-based information sources but not for Web-based information sources, television and radio, family members and friends, and librarians. This may demonstrate an overlap in perceptions of relevance and reliability, or a relationship between the two variables. This alters the proposed regression model which postulates that linear relationships exist solely between the independent variables and the dependent variable, frequency of seeking health information on the Web, while shared variance in multiple predictors was found to be minimal according to collinearity statistics for multiple regressions on the original model (three facets).

4.3.4 Summary of descriptive statistics on information source characteristics

Healthcare practitioners received the highest ratings for perceived information source quality (relevance and reliability) but were also rated among the most inaccessible information sources.
Websites received fairly high ratings for both quality and accessibility, as did print information sources. However, Web-based communication channels (bulletin board, chatrooms, listservs, newsgroups), while regarded as relatively easy to access, were not considered high quality information sources, and many respondents did not provide ratings for these items altogether. This may indicate that low perceptions of information source quality for Web-based CMC channels result in lack of use. Family members received high ratings for information source accessibility but rather low ratings for information source quality. Librarians received moderate ratings for both information source quality and accessibility, with quality ratings being lower than expected given their professional expertise in the provision of information services. Electronic information sources received low ratings for perceived information source accessibility (physical access) and moderate ratings for information source quality.

Correlation analysis reveals survey respondents group together similar information sources and they differentiate dissimilar information sources, both in terms of perceived information source accessibility and perceived information source quality. Paired t-tests indicate that respondents were generally able to distinguish between the two measures of perceived information source accessibility but were not able to do so for the two measures of perceived information source quality, with the exception of print information sources, a finding that has implications for testing relationships with these variables and the dependent variable postulated in the theoretical framework.

These findings on information source preferences from the study survey are similar to findings from a mail survey study on information source use by women seeking health information, although perceptions of information source quality and accessibility were not investigated (Procaccino and Warner (2007). Respondents utilized multiple information sources, including the daily newspaper, magazines, books, radio, television, and the Web. They also visited
public libraries at least once a month. Web users sought health information more frequently than non-Web users in relationship to a visit to a doctor or clinic. Web users were demonstrably more active than non-Web users in seeking information to supplement that given by the medical professional. With few exceptions, the awareness of resources, regardless of format, was higher among Web users. Level of education affected this finding; those with more education exhibited greater awareness of health information sources listed by the researchers in their survey instrument.

4.4 Family caregiving: status, role and experience

Section E comprises three items concerning family caregiver role and experience, with the least specific item presented first and the most detailed item presented last.

4.4.1 Family caregiver status

The first caregiving questionnaire item is a dichotomous variable that asks respondents if they provide care to one or more family members. Two hundred and fifty four respondents completed this item, of which 171 (67.3%) said no and only 83 (32.7%) said yes. Approximately two-thirds of survey respondents are not family caregivers.

4.4.2 Number and type of care recipients

The second caregiving questionnaire item is a nominal variable that asks respondents to select all individuals for whom they provide caregiving, according to their relationship to the caregiver. The options for types of care recipient are: child (under 1, 1-5, 6-10, 11-15, 16-20, over 20); spouse/partner; parent (mother, father); sibling (sister, brother) and other. There were between 84 to 88 valid responses for each type of care recipient. The majority of care recipients were children (75), categorized as follows: child aged 11-15 (22); child aged 6-10 (21); child 16-20 (12); child aged 1-5 (11); child over 20 (5); child under 1 (4); followed by spouse/partner (44) and parents (30): parent/mother (19) and parent/father (11).
When asked for whom they use the Web for health reasons, survey respondents in Yoo’s study (2004, p. 92) overwhelmingly selected myself (91%); child/children (82%); parent (45%); other family member (31%); friends (26%); spouse (35%), and other (17.4%). Comparing the frequency distribution for caregiving between these two dissertation surveys, it is apparent that they are quite similar. In both studies of women seeking health information on the Web, children are the care recipients for whom health information is most commonly sought online, followed by parents, and spouse/partner.

From the second caregiver item, an interval variable was calculated by summing all types of care recipients. The mean is 1.9 (median=2.0; mode=1; sd=1.3; skew=2.065; kurtosis=5.689) and the distribution is skewed and peaked. On average, family caregivers in this study provide care to two types of care recipient. However, a small number of caregivers provide care for more than four types of care recipient. When children are considered separately, types of children are summed to create the interval variable E2_Child, which has a mean of 0.9 (median=1.0; mode=1; sd=0.851; skew=0.836; kurtosis=0.806) and a normal distribution. Similarly, when adults are considered separately, types of adult care recipient are summed to create the interval variable E2_Adult, with a mean of 0.9 (median=1.0; mode=1; sd=0.835; skew=1.198; kurtosis=2.085) and a positively skewed and peaked distribution. Overall, family caregivers in this study care for both one type of child and one type of adult care recipient.

4.4.3 Perceptions of the family caregiving experience

The third caregiver item comprises 12 items from the 24-item caregiver reaction scale developed by Given et al. (1992). It contains five subscales: self-esteem; lack of family support; disrupted schedule; health problems, and financial problems. Factor analysis with varimax rotation confirms the importance of self-esteem as the highest ranked factor, in agreement with previous research on this scale (Nijboer et al., 1999).
There were 84-86 valid responses for each item on this scale. The majority of survey respondents who are family caregivers selected Agree or Strongly Agree for two items in the self-esteem subscale. Neither Agree nor Disagree and Agree were the two most common responses for items in the Financial Problem subscale (reversed) and Disrupted Schedule subscale, perhaps indicating some degree of ambivalence with these dimensions of caregiving. For the Disrupted Schedule subscale, the most common responses were Agree and Strongly Agree. The Lack of Family Support subscale received the largest number of Strongly Disagree scores. In summary, family caregiving is associated with positive self-esteem and supportive family members. However, family caregiving is also recognized as being disruptive to the caregiver’s schedule, a negative attribute of the caregiving experience.

For each subscale, the mean value was calculated by averaging the scores for the items belonging to each subscale. The mean value for the self-esteem subscale is 4.1 (median=4.0; mode=5.0; sd=0.80; skew=-0.59; kurtosis=-0.20) and the distribution is normal. The mean value for the family support subscale is 2.3 (median=2.5; mode=2.0*m-m; sd=0.93; skew=0.30; kurtosis=-0.48) and the distribution is normal. The mean value for the disrupted schedule subscale is 3.3 (median=3.0; mode=3.0; sd=1.08; skew=-0.32; kurtosis=-0.84) and the distribution is normal. The mean value for the financial problems subscale is 2.9 (median=3.0; mode=2.5; sd=1.08; skew=0.25; kurtosis=-0.84) and the distribution is normal. The mean for the health problems subscale is 2.5 (median=2.3; mode=2.3; sd=0.91; skew=0.25; kurtosis=-0.84) and the distribution is normal.
4.4.4 Summary of family caregiving

The majority of survey respondents are not family caregivers at the time of their participation in this study. However, of those who are family caregivers, many care for more than one person, usually an elderly parent and a child, and oftentimes, a spouse/partner. Most respondents view family caregiving as a positive experience. However, they acknowledge that family caregiving detracts from their daily activities, making planning difficult. There is some relationship between the age of the respondent and the type of care recipients, insofar as young study participants may be involved in caring for parents or grandparents while middle-aged study participants provide care to children and aging parents who may have multiple health conditions. Family caregiving experiences can be positive or negative depending on the various aspects of the caregiving situation, including severity of care recipient illness, amount of family support, length of time of the relationship between caregiver and care recipient and the quality of the relationship between caregiver and care recipient.

4.5 Health information need

4.5.1 Subjective measure of health information need

The first item from the survey questionnaire asks respondents, “Over the past three months, what health concerns have you personally experienced, pertaining to your own health status that led you to look for health information?” For each personal health condition listed (up to five), respondents were asked to rate the amount of uncertainty they experienced when the health information need arose. Uncertainty was defined as the inability to decide what to do with respect to your health concern(s). This subjective measure produces the following set of frequency distributions, summarized in table 4.13 below.
The majority of respondents listed only one personal health condition and rated the perceived uncertainty associated with that health condition as "some uncertainty". However, a considerable number of respondents also listed up to three personal health conditions. Twenty-three (less than 10%) survey respondents listed five personal health conditions.

<table>
<thead>
<tr>
<th>Personal Health Condition</th>
<th>N</th>
<th>Categories of uncertainty (valid percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>1</td>
<td>246</td>
<td>16.7</td>
</tr>
<tr>
<td>2</td>
<td>189</td>
<td>15.9</td>
</tr>
<tr>
<td>3</td>
<td>116</td>
<td>13.8</td>
</tr>
<tr>
<td>4</td>
<td>57</td>
<td>15.8</td>
</tr>
<tr>
<td>5</td>
<td>23</td>
<td>21.7</td>
</tr>
</tbody>
</table>

Table 4.13: Frequency distribution of respondents’ ratings of uncertainty that lead to seeking health information

To capture the overall amount of uncertainty experienced by respondents in relation to their personal health concerns, an interval variable was calculated by adding together the uncertainty values for personal health conditions 1 through 5. The mean value is 2.3 (median=2.2; mode=2.0; sd=0.6922; skew=0.215; kurtosis=0.095) and the distribution is normal. Another measure of overall uncertainty pertaining to personal health conditions was calculated, the average uncertainty rating. The mean value is 6.0 (median=5.0; mode=2.0; sd=3.5107; skew=0.861; kurtosis=0.769) and the distribution is normal. The number of missing values is low for both subjective measures of health information need (18).

4.5.2 Objective measures of health information need

An objective measure was calculated simply by adding together the number of personal health conditions listed in Section D of the survey for each respondent. When total number of personal health conditions is computed, the mean value is 2.5 (median=2.0; mode=2.0; sd=1.272; skew=0.418; kurtosis=-0.681) and the distribution is normal.
A frequency distribution reveals the following: depression (29); cancer, all types (26); arthritis, all types (25); weight/weight change/obesity (21); headaches, all types (18); fatigue/chronic fatigue syndrome (18); menopause and perimenopause (16); asthma (15); menstruation/PMS (14); influenza (14); birth control (13); sleep disorders (12); diet and nutrition (12); yeast infections (9); anemia (9); exercise and fitness (9); pregnancy (8); pain disorders (8); stress (8); fibromyalgia (7); eating disorders (6); allergies (6); anxiety (5); hypertension (5); Crohn’s and colitis (5), and many other health conditions.

Similarly, the total number of care recipient health conditions was computed. The mean value is 1 (median=0; mode=0; sd=1.220; skew=1.398; kurtosis=1.420) and the distribution is positively skewed and peaked indicating that the majority of the values fall on the low end of the end of the scale. This is not surprising, given that the many of respondents in this study are young women, and therefore, are not family caregivers. The frequency distribution for this variable reveals the following: zero number of care recipient health conditions (1); one care recipient health condition (61); two care recipient health conditions (34); three care recipient health conditions (20); four care recipient health conditions (7) and five care recipient health conditions (5). Many of the care recipients (61) of the survey respondents have one health condition. However, more than half of care recipients (66) have two or more health conditions. Alternatively, it is plausible that some caregivers are caring for more than one individual, each of whom may have one or more than one health condition. The most frequently listed care recipient health conditions are as follows: cancer, all types (14); upper respiratory tract infection/flu/colds/fever (10); depression (8); diabetes (8); arthritis (7); ADD/ADHD (7); Alzheimer’s Disease (5); osteoporosis (4), and stroke (4). An interval level variable of this objective measure of health information need was computed that sums all personal health conditions and care recipient health conditions. The mean value is 3.5 (median=3.0; mode=3.0; sd=1.909; skew=0.901; kurtosis=0.928) and the distribution is normal.
4.5.3 Classification of personal health conditions

Personal health conditions can be categorized according to body organ system and healthy lifestyle concerns. When personal health condition 1 is categorized into 15 groups, the frequency distribution (valid percent) is as follows: reproductive (17.4%); mental health (15.3%); musculoskeletal (8.7%); cardiovascular (7.4%); ill-defined (7.0); cancer (6.6%); neurological (6.2%); skin (5.0%); autoimmune (4.5%); healthy lifestyle (4.1%); digestion (3.3%); endocrine (2.5%); immune (2.5%); and renal (2.1). Clearly, reproductive conditions and mental health conditions predominate in this survey.

4.5.4 Representation of mental health conditions in study sample

One can examine mental health conditions separately. From the list of personal health conditions, the total number of mental health conditions (mhc) is calculated by summing all mental health conditions listed in the first item (personal health condition 1). For this interval variable, the mean value is 0.5 (median=0; mode=0; sd=0.74; skew=1.673; kurtosis=3.039). The frequency distribution (in valid percent) is as follows: no mhc (62.4); one mhc (28.6), 2 mhc (6.5), 3 mhc (2.0) and 4 mhc (0.4).

Mental health conditions represent 15.3% of all health conditions listed, as mentioned on the previous page in section 4.6.3. Examining the breakdown of mental health conditions listed by respondents for personal health condition 1 according to DSM IV categories, the frequency distribution is as follows: mood disorders (25.0%); weight concerns (25.0%); anxiety disorder (13.9%); eating disorders (13.9%); pain disorders (8.3%); sleep disorders (5.6%); personality disorder (2.8%); psychotic disorders (2.8%), and substance-related disorders (2.8%).
For personal health condition 2, mental health conditions represent 15.2% of all health conditions listed. The breakdown of mental health conditions is similar to that observed for health condition 1: mood disorders (37.5%); anxiety disorder (17.5%); weight concerns (15.0%); eating disorders (5.0%); sexual and gender identity disorders (5.0%); sleep disorders (10.0%); substance related disorders (2.5%) and other (7.5%).

4.5.5 Severity of personal health conditions

An eight-level ordinal severity scale was developed for personal health condition 1 based on several established sources of population health data, as follows:

- Health Indicators: Statistics Canada and the Canadian Institute for Health Information;
- Health Reports, Health Analysis Division (HAD) of Statistics Canada;
- Canadian Cancer Statistics, Canadian Cancer Society;
- Morbidity and Mortality Chart Book on Cardiovascular, Lung, and Blood Diseases, National Heart, Lung, and Blood Institute (NHLBI), National Institutes of Health (US);
- Diagnostic and Statistical Manual of Mental Disorders (DSM), American Psychiatric Association;
- Mortality data, World Health Organization.

This unvalidated scale takes into consideration several parameters, namely, the mortality, disability, pain, social stigma, health care utilization/cost, treatment efficacy/curability, quality of care, and impact on significant others (caregiver burden), associated with each type of health condition. It is stressed that this scale attempts to give equal weight to mortality and dimensions of quality of life. It is not solely derived from mortality data.

Level 1 health conditions scale comprises health concerns that have no mortality. They are not associated with pain, disability, or stigma. They do not require treatment. This level includes healthy lifestyle concerns, such as nutrition, exercise, and sexuality.
Level 2 health conditions are characterized by absence of mortality but may be associated with one or more of the following: minor pain, disability or stigma. These conditions can be successfully treated at low cost. Level 2 health conditions include minor skin conditions, such as acne and warts, as well as hemorrhoids, varicose veins, allergies, vaccination, incontinence, and birth control methods.

Level 3 health conditions have low mortality and may be characterized by one or more of the following: minor pain, disability, and stigma. They can be treated successfully. Level 3 health conditions include anemia, mild infectious diseases, e.g. common cold, minor neurological conditions, e.g. headache (not migraine), minor dental problems, nutritional deficiencies, and mild mental health conditions.

Level 4 health conditions are associated with low mortality, but a moderate amount of one or more of the following: pain, disability, or stigma. They are generally treatable. Level four health conditions include the following: some gynecological conditions (endometriosis, fibroids, menopause), some digestive conditions (stomach ulcer), some musculoskeletal conditions, some endocrine conditions (diabetes), some cardiovascular conditions (angina, chest pain), some autoimmune conditions (Crohn’s and colitis), some sexually transmitted infections, and some cognitive/learning disabilities.

Level 5 health conditions are associated with moderate mortality and a moderate amount of one or more of the following: pain, disability, or stigma. Level 5 health conditions include asthma, chronic musculoskeletal and neuromuscular conditions (osteoarthritis), some digestive system conditions (pancreatitis, acid reflux, gall bladder inflammation), liver and kidney conditions (gout, kidney stones), some gynecological conditions, and some cardiovascular conditions (hypertension, platelet disorder, arrhythmia).
Level 6 health conditions are characterized by moderate mortality and impact on significant others, as well as one or more of the following: high pain, disability, or stigma. Level 6 health conditions include some autoimmune conditions (multiple sclerosis), some neurological conditions (Tourettes, epilepsy), and major mental health conditions (mood disorders, eating disorders, pain disorders, schizoaffective disorder, post-traumatic stress disorder).

Level 7 health conditions are characterized by high mortality, extensive treatment, impact on significant others, and one or more of the following: great amount of pain, disability, or stigma. Level 7 health conditions include severe cardiovascular conditions (heart attack, stroke, congestive heart failure), and cancer (breast, prostate).

Level 8 health conditions are associated with high mortality, extensive treatment that may not be successful or difficult to obtain, extensive impact on significant others, and a considerable amount of one or more of the following: pain, disability, or stigma. Level eight health conditions include difficult-to-treat or untreatable cancers (glioblastoma, mesothelioma, metastatic cancers), AIDS, Stephen-Johnson syndrome, neurodegenerative conditions, such as Alzheimer’s Disease, Parkinson’s Disease, and severe mental health conditions causing injury to self or others (severe psychosis).

The frequency distribution for this post-study objective variable of health status (valid percent) is as follows: none (3.3%); very low (9.9%); low (16.5%); low/medium (30.6%); medium (18.2%); medium/high (13.2%); high (6.2%); and very high (2.1%). The majority of personal health conditions (personal health condition 1) in this study sample are of low/medium severity.
Classification of personal health condition 1 according to this 8-point severity scale was revised; the categories were collapsed into a dichotomous variable with two values: low severity and high severity. The frequency distribution (valid percent) for this operationalization of health status is as follows: low severity (60.3) and high severity (39.7).

Previous measures of health information need, in terms of health condition, have either considered the sum or average of all personal health conditions, or some aspect of personal health condition 1. However, it is also possible to operationalize this variable as the maximum severity value over all five personal health conditions for each respondent. This takes into consideration the possibility that survey respondents did not necessarily list their most troublesome health condition first. For this objective measure of health status, the mean value is 5.0 (median=5.0; mode=5; sd=1.399; skew=-0.086; kurtosis=-0.001). The frequency distribution (valid percent) is as follows: 1 (0.8%); 2 (3.3%); 3 (8.3%); 4 (24.0%); 5 (27.7%); 6 (23.1%); 7 (8.7%); and 8 (4.1%). In comparison to the previously mentioned severity-scaled measure, more respondents were found to have personal health conditions of higher severity. Thus, the first personal health condition listed was often not the most severe condition for each respondent. The dichotomous version of this post-study operationalization of the independent variable, health information needs, minus the first level, is utilized in the path analyses detailed in section 4.5, model testing.

4.5.6 Summary of health information needs and health conditions

Overall, survey respondents are most likely to have two personal health conditions and to rate the perceived uncertainty associated with their health condition(s) as “some uncertainty”, irrespective of the severity of the health condition. Over twenty types of health conditions were listed in the blank space provided for the subjective rating of personal health conditions.
The most frequently listed personal health conditions were depression, cancer, and arthritis. Personal health conditions are mostly of low or moderate severity. Additionally, the majority of respondents who are family caregivers (approximately one-third of the sample) listed one health condition for their care recipient. The most frequently listed care recipient health conditions were upper respiratory tract infection, which is common in children, and cancer, which would be predominantly found in aging parents, suggesting that those respondents who are family caregivers are taking care of young children or aging parents, or both types of care recipient.

4.5.7 Prevalence of health conditions in Canadian women

Several authoritative reports on the health status of Canadians published in the late 1990s have examined sex (biological) and gender (sociological) differences in the prevalence of physical and mental health conditions. In particular, Health Canada’s Women’s Health Strategy highlighted findings on differences between women and men in the prevalence of disease. In Canada, women outlive men and have a lower death rate than men across all age groups, with the exception of cancer deaths in the age group 20-44, which is largely attributable to breast cancer. In 1994, lung cancer surpassed breast cancer as the leading cancer killer of women. However, the greatest killer of women and also of disability in women is not cancer, but cardiovascular disease, a statistical reality that many women are unaware of.

Despite living longer than men, women’s later life is often characterized by isolation, disability and health problems. In most age groups, women suffer more than men from chronic conditions, particularly migraines, allergies, arthritis and rheumatism. Younger women report more back and limb problems than young men. Women are more likely to live in poverty due to wage gaps, and low occupational status. Women with low levels of education,
income, and occupational status are more likely to smoke and to be both sedentary and obese, unhealthy lifestyle practices that in turn affect disease prevalence (Health Canada, 1999a, 1999b; Statistics Canada, 1995).

Comparing disease prevalence in Canadian women in the late 1990s with disease prevalence in the sample of women surveyed for this study which was conducted in 2000-2001, it is evident that cardiovascular disease and cancer, the two major causes of mortality for Canadian women, are under-represented in the survey sample, which can be attributed to the younger age demographic of the survey sample. However, musculoskeletal, neurological, and immune/autoimmune conditions, which may include overlapping conditions, such as rheumatoid arthritis, are well represented in this study’s survey sample, attesting to the importance of these chronic and debilitating health conditions to women across the lifespan.

One of the areas of greatest difference between women and men in Canada is their respective profiles of mental health disorders. Many studies published in the 1990s and earlier, including the National Population Health Survey, have reported much higher levels of depression among women. Women are also more likely to experience recurring depressive episodes. The rate of psychiatric hospitalization is consistently higher for women. Although, men commit suicide more frequently, women attempt suicide more often but are more likely to fail in their attempts. Young women are more apt to have a low self-image and unrealistic expectations about their physical appearance that can lead to eating disorders such as anorexia and bulimia. Disturbed sleep and tiredness were also identified as issues (Health Canada, 1999a, 1999b; Statistics Canada, 1995).
As mentioned previously in Section 4.6.4, mental health conditions represented slightly more than 15% of all health conditions listed by survey respondents, with mood disorders (25%) listed most frequently. Eating disorders and weight concerns were also frequently listed. Pain disorders and sleep disorders were also represented in the survey sample. Clearly, mental health conditions frequently found in Canadian women were also key concerns for a significant number of women in this study.

More recent reports on the health of women in Canada, and in Ontario, respectively, were published several years after this study had been completed. Statistics Canada’s *Women in Canada: A gender-based statistical report* (2005) provides detailed comparisons on disease prevalence in women and men by age group. Sex differences in the prevalence of chronic health conditions in the Canadian population in 2003 are summarized in Table 3.2 (page 75). The largest sex differences with greater prevalence for women are evident for allergies (non-food and food allergies); arthritis/rheumatism, migraines, and asthma, while the prevalence of heart disease is greater in men. Sex differences in the prevalence of back problems, diabetes, and high blood pressure, are quite small. Age-standardized lung and breast cancer death rates from 1979 to 2001 are illustrated in Chart 3.4 (page 58). The lung cancer death rate for men is clearly much higher than for women. However, the lung cancer death rate for women is increasing, while the lung cancer death rate for men is decreasing.

With respect to mental health disorders, almost twice as many women than men in Canada in 2003 reported having a diagnosed mood disorder. From chart 3.11 (page 67), the number of hospital separations for mental health disorders, by cause, from 2002 to 2003, reveals a higher rate for women than men of affective psychoses, neurotic and personality disorders, and senile and presenile organic conditions. Men had a higher rate
than women of schizophrenic psychoses, alcohol dependence syndrome, alcoholic psychoses, and drug dependence. However, hospital data on mental health disorders only captures a small number of individuals because most mental health disorders are treated in outpatient settings.

Detailed information on the prevalence on mental health disorders in Canadian women is available from the Women’s Health Surveillance Report (Canadian Institute for Health Information, 2003) and the Ontario Women’s Health Status Report (Ontario Women’s Health Council, 2002). According to Stewart, Gucciardi, and Grace (2003), Canadian women are almost twice as likely as men to experience depression, with the highest rates of depression found in women of reproductive age. Women who experience greater severity of chronic pain have a higher prevalence of depression. Women who are single parents have double the rate of depression than women generally. Nine months is the duration of the average depressive episode if left untreated. About half of those who had one episode of depression will experience a recurrence. Surprisingly, less than one third of depressed Canadian women took antidepressant medication. The POWER study (Project for an Ontario Women’s Health Evidence-Based Report) provides current data on the prevalence of health conditions in Ontario and important data on the provision of care. The prevalence of probable depression is 7.4%. Women were twice as likely to have probable depression as men in Ontario (Lin, Diaz-Granados, Stewart, et al., 2009). In this study’s survey, depression was by far the most commonly listed mood disorder, reflecting its prevalence in the general population of Canadian women.

Clinical eating disorders are increasing in prevalence in young women, including preadolescent women. Anorexia nervosa is characterized by low body weight and food restriction. Bulimia is characterized by frequent fluctuations in weight and compulsive binge eating followed by self-induced vomiting and other drastic measures to prevent weight gain.
In Ontario, women represented over 90% of individuals hospitalized for anorexia nervosa and bulimia in 1999. Identified risk factors include negative body image, low self-esteem, chronic dieting, fear of weight gain, and social pressures to be thin. Women with eating disorders may also be at risk of depression, anxiety, substance abuse, and even suicide (Gucciardi and Stewart, 2002; Gucciardi, Celasun, Ahmad, and Stewart, 2003). The prevalence of eating disorders and weight concerns in this study sample are reflective of the predominance of young women in the sample.

Chronic pain conditions such as fibromyalgia were also observed in this study sample. The comorbidity of chronic pain conditions and depression and gender differences in their prevalence was studied retrospectively by Munce and Stewart (2007) using data collected in 2000-2001 by Statistics Canada for the Canadian Community Health Survey. They found a higher prevalence of depression in women than men in each of four chronic pain conditions and a greater proportion of depressed women who rated their pain as severe, and who reported more chronic conditions (p. 396).

Also of interest are the differences in prevalence of autoimmune diseases between women and men. There are over seventy autoimmune disorders, many of which disproportionately affect women. According to Whitacre (2001), women represent more than 80% of those afflicted with Sjogren’s syndrome, lupus, autoimmune thyroid diseases, and scleroderma. Also, women represent 60-75% of those afflicted with rheumatoid arthritis, multiple sclerosis, and myasthenia gravis. Walsh and Rau (2000) found that autoimmune diseases collectively represent one of the ten leading causes of death in the United States for women younger than sixty-five years of age. In this study survey, 4.5% of respondents listed an autoimmune disorder for personal health condition 1. This percentage is comparable to that of the prevalence of autoimmune diseases in the US population at the time of this study, which was approximately 5% (Whitacre, 2001).
4.6 Model testing

4.6.1 Overview of study model

This multi-method exploratory study tests a theoretical model (Figure 3.1, p. 63) comprising direct linear relationships between a dependent variable, frequency of Web use for the purpose of finding health information on the Web, and several independent variables, as follows: survey respondents’ perceptions of the Web as an information source, in terms of quality (relevance and reliability) and accessibility (physical and cognitive); uncertainty associated with health information need based on current health status (personal health conditions), family caregiving, and Web self efficacy. Other variables not specifically identified in the theoretical model, but for which data were collected, are primarily demographic variables (age, household income, racial identity, education, marital status, language, geographic location), as well as an item concerning the method of publicity by which a survey respondent was recruited to this study (study publicity). Study variables are predominantly five-category ordinal variables. As well, missing values for each item were identified and labeled appropriately.

The two objectives of inferential statistical analysis are to test hypotheses about the relationships between the independent variables and the dependent variable, and to test model fit. Because the Web was conceptualized as having two facets: text-based content websites and communication channels, the latter of which was further divided into two facets: bulletin boards and chatrooms, and listservs and newsgroups, respectively, there are three instantiations of the theoretical model, one for each facet of the Web.
Multiple regression analyses for these three versions of the theoretical model revealed that very few independent variables are directly related to the dependent variable, FSHIW. Indeed, only one independent variable, perception of reliability of the Web as an information source, was consistently found to have a direct effect on the dependent variable; frequency of use of the Web as a source of health information. This bivariate relationship is positive across these three facets of the Web. However, the strength of the relationship (standardized beta weight) and its significance (p-value), varies from weak to moderate in the multiple regression model. Also, it fluctuates in relation to the number of variables entered into the model. As well, the multiple regression model fit is not significant, thus the original conceptual framework as outlined in Figure 3.1 on page 63 does not adequately represent the survey data.

Examination of the Spearman non-parametric correlation matrices of all study variables for each of the three facets of the dependent variable, frequency of seeking health information on the Web (FSHIW), suggest that many of the bivariate relationships between variables do not involve the dependent variable; rather, they are relationships between the independent variables. This explains their absence from the multiple regression equations, which identified perceived information source reliability, as well as household income and racial identity, as key variables influencing the dependent variable for Web-based CMC, and health information needs, occupation, and racial identity, as key variables influencing the dependent variable for website content, with a weak role for perceived information source reliability. While the presence of bivariate relationships between independent variables may seem initially as crosstalk between variables, and outside of the scope of the conceptual framework depicted in Figure 3.1 on page 63, which posited positive bivariate relationships between each independent variable and the dependent variable, FSHIW, it led to the consideration of another statistical approach, that of path analysis.
4.6.2 Path analysis and assessing the study model

Path analysis is a form of structural equation modeling that represents an extension of multiple regression analysis. It permits the simultaneous calculation of a series of multiple regression analyses and the examination of mediated (indirect) pathways as well as direct pathways. Statistical assumptions for path analysis are the following: multivariate normality; interval-level data; linear relationships between variables; no interaction effects; no under-identification or under-determination (too few structural equations) of the model; recursivity (all arrows are unidirectional), adequate sample size, with ten or more times as many cases as parameters; proper specification of the model (the inclusion of all significant causal variables in the model, and no missing values for any of the variables so that the same sample is used to calculate all paths. However, violations of one or more of these assumptions are not uncommon and are accommodated by several relative model fit measures (Tanaka, 1987; Norman and Streiner, 2000; Streiner, 2005; Olobatuyi, 2006).

AMOS (analysis of moment structures) is an add-on module for SPSS designed primarily for structural equation modeling, path analysis, and covariance structural modeling. Version 16 was utilized to conduct path analyses of re-specified models of the relational data from the Web survey questionnaire. Several path analysis statistics are similar to those generated for multiple regression analysis. The arrows in path models reflect hypotheses about relationships between variables and the path coefficients and their significance (p-values) are equivalent to standardized regression beta weights. As well, R-squared (coefficient of determination) summarizes the proportion of variance in the dependent variable explainable by the collective set of predictors, is also generated. A perfect R-squared of 1.0 demonstrates that all of the variables in the model account for all of the variance in the dependent variable, in other words, how well the model approximates the actual data points.
However, reported R-squared in research studies is frequently considerably less than 1.0. Differences in opinion exist concerning what value of R-squared is acceptable, with some maintaining a minimum of 0.50 and others arguing that 0.25 is acceptable, depending on the type of data set and the context.

Measures of model fit assess the validity of the researcher's model. Ideally, good model fit results from a correctly specified model that adequately represents the sample data. However, good model fit may also be the result of a highly over-parameterized model that accounts for the fit of the model in the sample, irrespective of whether a match between the specified model and the population covariance matrix actually exists. The correct model in this sense means the most correct from all of the alternative models. It does not mean that the proposed model is right; simply that it has not been shown to be wrong. The choice of which model best represents the correlation matrix data from several equally plausible models should be driven not solely by attaining robust effect sizes and measures of fit in the AMOS output, but also by the proving or disproving the researcher's hypotheses (Norman and Streiner, 2000; Streiner, 2005).

The absolute measure of model fit is the chi square test. Unlike traditional statistical tests, a small, non-significant chi square indicates good model fit; the predicted model is congruent with the observed data. The fit is considered better the closer the chi-square value is to the degrees of freedom for a model (Thacker, Fields, and Tetrick, 1989). However, the chi-square test is strongly influenced by sample size. Models based on small samples may be accepted even when misspecification is considerable. Conversely, models based on large samples may be rejected even when misspecification is minor. The larger the sample size, the more likely the rejection of the model (Tanaka, 1987).
Unlike relationship testing by correlation or regression analysis, there is no formula for calculating desired sample size for path analysis. Sample size is not related to the number of variables, but instead to the number of parameters, which includes the paths, variances, and covariances. A rough rule of thumb offered by Norman and Streiner (2000, p. 186) is a minimum of 10 subjects per parameter, preferably 20, and a minimum of 200 subjects. With 264 study participants in this study, the minimum total number of subjects has been met. When each of the three path analysis models is examined, it is evident that the minimum number of subjects is met. However, the ideal number of subjects is not achieved. For the path analysis model with the dependent variable, frequency of seeking health information on the Web (websites), the number of parameters is 22, thus the number of subjects per parameter is 12. For the path analysis model with the dependent variable, frequency of seeking health information on the Web (Web-based bulletin boards/chatrooms), the number of parameters is 18, thus the number of subjects per parameter is 15. For the path analysis model with the dependent variable, frequency of seeking health information on the Web, Web-based CMC (Listservs/Newsgroups), the number of parameters is 19, and thus the number of subjects per parameter is 14.

The chi-square fit index is very sensitive to violations of the assumption of multivariate normality. AMOS provides a considerable number of fit indexes. CMIN/DEF is the chi-square fit index divided by degrees of freedom. This relative chi-square, also referred to as normal chi-square, is less sensitive to sample size. Ideally, CMIN/DEF should be less than 2 and no more than 3 (Byrne, 1989).
Apart from absolute and relative chi-square fit indexes, one group of fit indexes are the incremental or comparative fit indexes, which measure the proportionate improvement in fit by comparing a target model with a more restricted, nested baseline model, generally a null model in which all the observed variables are uncorrelated, referred to as the independence model. From this group, two fit indexes are recommended for routine use: CFI (comparative fit index) and TLI (Tucker-Lewis index, also known as NNFI, non-normed fit index). For both, a value greater than 0.90 is acceptable fit, and close to 1.0 indicates very good model fit.

Another set of fit indexes are the parsimony-adjusted measures, which penalize for a lack of parsimony or model complexity. RMSEA (root mean square error of approximation) is the standardized measure of error of approximation. It is a popular measure of fit from this group of fit indexes. A value of less than 0.05 indicates close fit, with 0.0 indicating exact fit.

A less known set of fit indexes based on information theory is used appropriately when comparing models which have been estimated using maximum likelihood estimation. ECVI (expected cross-validation index or sample cross-validation index) is one of many measures from this group. MECVI is a variant on the Browne-Cudeck criterion (BCC). For both ECVI and MECVI, the value of the default model should be smaller than that of the saturated and independence model (Byrne, 2009).

The SPSS correlation matrix and the AMOS output of path analysis statistics, including path diagram with significant study variables and error terms for endogenous variables, path coefficients and their level of significance, and goodness of fit indices for model fit, are presented for each of the three models of women's health information seeking on the Web, commencing with the dependent variable, FSHIW (websites).
### 4.6.3 Path analysis of the model: FSHIW (websites)

<table>
<thead>
<tr>
<th>Model Variables</th>
<th>Measurement</th>
<th>Model Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSHIW: Websites</td>
<td>Correlation Coef</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Sign. (2-tailed)</td>
<td>.146</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>178</td>
</tr>
<tr>
<td>Physical Access</td>
<td>Correlation Coef</td>
<td>.110</td>
</tr>
<tr>
<td></td>
<td>Sign. (2-tailed)</td>
<td>.146</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>176</td>
</tr>
<tr>
<td>Cognitive Access</td>
<td>Correlation Coef</td>
<td>-0.40</td>
</tr>
<tr>
<td></td>
<td>Sign. (2-tailed)</td>
<td>.603</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>173</td>
</tr>
<tr>
<td>Relevance</td>
<td>Correlation Coef</td>
<td>.025</td>
</tr>
<tr>
<td></td>
<td>Sign. (2-tailed)</td>
<td>.745</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>174</td>
</tr>
<tr>
<td>Reliability</td>
<td>Correlation Coef</td>
<td>.184</td>
</tr>
<tr>
<td></td>
<td>Sign. (2-tailed)</td>
<td>.016</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>172</td>
</tr>
<tr>
<td>Family Caregiving</td>
<td>Correlation Coef</td>
<td>.240</td>
</tr>
<tr>
<td></td>
<td>Sign. (2-tailed)</td>
<td>.060</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>172</td>
</tr>
<tr>
<td>Severity of Health Conditions</td>
<td>Correlation Coef</td>
<td>.176</td>
</tr>
<tr>
<td></td>
<td>Sign. (2-tailed)</td>
<td>.026</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>160</td>
</tr>
<tr>
<td>Occupation</td>
<td>Correlation Coef</td>
<td>.288</td>
</tr>
<tr>
<td></td>
<td>Sign. (2-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>177</td>
</tr>
<tr>
<td>Racial Identity</td>
<td>Correlation Coef</td>
<td>.333</td>
</tr>
<tr>
<td></td>
<td>Sign. (2-tailed)</td>
<td>.006</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>67</td>
</tr>
</tbody>
</table>
Table 4.14: Non-parametric correlation matrix for the dependent variable: FSHIW (websites)

The conceptual framework presented in Figure 3.1 on page 63 guided the development of the path analysis model. Significant bivariate relationships between the study variables observed in the correlation matrix were entered into the AMOS path analysis diagram. Paths between the variables depict the strength and direction of the relationships. Each single-headed arrow in the diagram is a regression weight. The strength of the model is measured by r-squared while the validity of the model is assessed by model fit indexes, as described in section 4.6.2 above.

The non-parametric Spearman correlation matrix is presented on the next page in Table 4.14. Variables with significant correlation coefficients, but non-significant beta coefficients in the corresponding path analysis model, are not included in this table. An examination of the correlation coefficients and their corresponding significance levels reveals that the most important relationships are found between information source variables, in particular, between information source relevance and reliability. As well, highly significant relationships are observed between the two demographic variables, occupation and racial identity, each in relation to the dependent variable, FSHIW (websites). In contrast, the correlation coefficients between the two situational variables, severity of health conditions and family caregiving, with the dependent variable, FSHIW (websites), are of modest strength and significance.

Table 4.15 below lists the standardized regression weights for all relationships in the path analysis model. The effect sizes support the Spearman non-parametric correlation matrix, although effect sizes are not identical to those in the correlation matrix. The largest estimate (.403) is observed between the two quality measures for the Web as an information source for health information: perceived information source relevance (relevance) and perceived information source reliability (reliability).
<table>
<thead>
<tr>
<th>Endogenous Variables</th>
<th>Antecedent Variables</th>
<th>Regression Weights</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical access (websites)</td>
<td>Cognitive Access (websites)</td>
<td>.274***</td>
<td>.061</td>
</tr>
<tr>
<td>Cognitive Access (websites)</td>
<td>Reliability (websites)</td>
<td>.180***</td>
<td>.071</td>
</tr>
<tr>
<td>Relevance (websites)</td>
<td>Reliability (websites)</td>
<td>.403***</td>
<td>.071</td>
</tr>
<tr>
<td>FSHIW (websites)</td>
<td>Reliability (websites)</td>
<td>.205***</td>
<td>.093</td>
</tr>
<tr>
<td>FSHIW (websites)</td>
<td>Health information need</td>
<td>.225***</td>
<td>.250</td>
</tr>
<tr>
<td>FSHIW (websites)</td>
<td>Family caregiving experience (self-esteem)</td>
<td>.208*</td>
<td>.156</td>
</tr>
<tr>
<td>FSHIW (websites)</td>
<td>Occupation</td>
<td>.315***</td>
<td>.189</td>
</tr>
<tr>
<td>FSHIW (websites)</td>
<td>Racial identity</td>
<td>.323***</td>
<td>.289</td>
</tr>
</tbody>
</table>

Table 4.15: Standardized regression weights for the dependent variable: FSHIW (websites)

*Significance levels: * p<.05; ** p<.01, ***p<.001, S.E. is the standard error

In table 4.16 below, the total, direct, and indirect standardized effects, are presented. Briefly, the total effect of each variable on another variable can be divided into direct effects (no intervening variables) and indirect effects (through one or more intervening variables). There are very few indirect effects in this path analysis model. Therefore, total effects are attributable for the most part to the direct effects, with the exception of the relationship between two endogenous variables, perceived reliability of the Web as a source of health information (reliability) and perception of cognitive access to health information on the Web (cognitive access). Overall, effect sizes are modest. This path analysis model comprises a small number of bivariate relationships of modest strength.
### Table 4.16: Summary of path analysis effects: total, direct, and indirect standardized effects, for the dependent variable: FSHIW (websites)

*Shaded areas indicate no effect between variables*

For the AMOS-generated path analysis model, the absolute measure of model fit, the chi-square value is 21.883, with 32 degrees of freedom, and non-significant probability of 0.910. A non-significant chi-square test establishes that this path analysis model, derived from the observed data, and generally referred to in the statistics literature as the over-identified or reduced model, does not differ significantly from the ideal path analysis model, known as the just-identified or full/saturated model.
<table>
<thead>
<tr>
<th>Measure of Model Fit</th>
<th>CMIN/DEF</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>ECFI</th>
<th>MECFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual value</td>
<td>0.684</td>
<td>1.000</td>
<td>1.148</td>
<td>.000</td>
<td>.251</td>
<td>.257</td>
</tr>
<tr>
<td>Ideal value</td>
<td>&lt; 2-3</td>
<td>&gt; 0.9, =1.0</td>
<td>Close to 1.0</td>
<td>Close to 0</td>
<td>Smaller than saturated (.411) and independence (.605) models</td>
<td>Smaller than saturated (.427) and independence (.608) models</td>
</tr>
</tbody>
</table>

Table 4.17: Relatives measures of path analysis model fit for the dependent variable: FSHIW (websites)

In terms of model fit measures other than absolute chi-square, several alternative fit measures are summarized in table 4.17 above. Both the actual values and ideal values are presented. These measures were described in section 4.6.2 on pages 194-195. For all of these measures of model fit, the values are close to, if not identical to perfect values, thereby supporting the absolute model fit measure, chi-square test. It is appropriate to conclude that this path analysis model illustrating the causal chain of factors influencing how women seek health information on the Web for the websites facet exhibits excellent absolute and relative model fit.

The path analysis model diagram (figure 4.1) below includes all direct and indirect paths, their effect sizes and significance levels, as well as the R-squared value for the dependent variable, frequency of seeking health information from the Web, FSHIW (websites). For endogenous variables, which are those variables with arrows pointing towards them, error terms are depicted as circles. The error term, also referred to as the disturbance term, captures both the imprecision in the measurement of the endogenous variable, and any other factors affecting the endogenous variable that were not measured. The error terms must be included; otherwise AMOS will not proceed with the calculation of the values for the parameters in the path analysis model.
This path analysis model comprises four information source variables, which are depicted as solid rectangles above the dependent variable, with only perceived information source reliability (reliability) directly influencing the dependent variable, FSHIW (websites). The two situational variables, severity of health conditions and family caregiving (caregiver experience: self-esteem) are depicted with dotted line rectangles and are placed below the dependent variable, FSHIW (websites). The two demographic variables, income and racial identity are depicted with broken line rectangles and located to the left of the dependent variable, FSHIW (websites).
The R-squared value, which summarizes the proportion of variance in the dependent variable explained by the collective set of predictors, is 0.34, indicating that approximately one-third of the variance in this path analysis model is accounted for by the study variables.

4.6.4 Path analysis of the model: FSHIW (Bulletin boards/Chatrooms)

Table 4.18 on the next page presents the non-parametric Spearman correlation matrix for the dependent variable, frequency of seeking health information on the Web from Web-based communication channels (Bulletin boards/Chatrooms). An examination of the correlation coefficients and their corresponding significance levels reveals that the most important relationships are found between perceived information source reliability (reliability) and each of the following independent variables: perceived information source relevance (relevance) and perceived information source accessibility (cognitive access). Household income (income) is significantly related to both perceived information source relevance (relevance) and perceived information source reliability (reliability). Interestingly, while family caregiving role (number of types of children cared for) does not exhibit significant relationships with other variables in this correlation matrix, it is weakly related to the dependent variable in this path analysis model. Overall, less than half of the 28 unique cells of the correlation matrix contain significant relationships.

Significant relationships are observed between the dependent variable, FSHIW: Web-based CMC (Bulletin boards/Chatrooms), and three of four information source variables, perceived information source reliability (reliability), perceived information source relevance (relevance), perceived information source accessibility (cognitive access), as well as with racial identity.
**Table 4.18:** Correlation matrix for the dependent variable: FSHIW: Web-based CMC (Bulletin boards/Chatrooms)

The standardized regression weights, or path coefficients, are represented in Table 4.19 on the next page. In general, the values are similar to the correlation coefficients in the Spearman non-parametric correlation matrix, although effect sizes are not identical. As well,
not all of the significant relationships in the correlation matrix are realized as significant path coefficients in the model.

<table>
<thead>
<tr>
<th>Endogenous Variables</th>
<th>Antecedent Variables</th>
<th>Regression Weights</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical access</td>
<td>Cognitive Access</td>
<td>.374***</td>
<td>.072</td>
</tr>
<tr>
<td>(Bulletin boards/Chatrooms)</td>
<td>(Bulletin boards/Chatrooms)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive Access</td>
<td>Reliability</td>
<td>.503***</td>
<td>.082</td>
</tr>
<tr>
<td>(Bulletin boards/Chatrooms)</td>
<td>(Bulletin boards/Chatrooms)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relevance</td>
<td>Reliability</td>
<td>.531***</td>
<td>.082</td>
</tr>
<tr>
<td>(Bulletin boards/Chatrooms)</td>
<td>(Bulletin boards/Chatrooms)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td>Racial Identity</td>
<td>-.271**</td>
<td>.319</td>
</tr>
<tr>
<td>(Bulletin boards/Chatrooms)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSHIW: Web-based CMC</td>
<td>Reliability</td>
<td>.398***</td>
<td>.091</td>
</tr>
<tr>
<td>(Bulletin boards/Chatrooms)</td>
<td>(Bulletin boards/Chatrooms)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSHIW: Web-based CMC</td>
<td>Family caregiving role</td>
<td>.230*</td>
<td>.164</td>
</tr>
<tr>
<td>(Bulletin boards/Chatrooms)</td>
<td>(number of types of children cared for)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSHIW: Web-based CMC</td>
<td>Household Income</td>
<td>.235**</td>
<td>.036</td>
</tr>
<tr>
<td>(Bulletin boards/Chatrooms)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Table 4.19: Standardized regression weights for the dependent variable: FSHIW: Web-based CMC (Bulletin boards/Chatrooms).

Significance levels: * p<.05; ** p<.01; *** p<.001; S.E. is the standard error

Table 4.20 on the next page presents the decomposition of effects: total, direct, and indirect standardized effects. Overall, effect sizes for this path analysis model, FSHIW: Web-based CMC (Bulletin boards/Chatrooms) are moderate in strength, in contrast to the small effect sizes observed for the path analysis model, FSHIW (websites). Again, it is evident that there are very few indirect effects in this path analysis model. Therefore, total effects are attributable for the most part to the direct effects. Overall, this path analysis model comprises a small number of bivariate relationships of intermediate strength,
with one cluster comprising information source characteristics, in particular, perceived information
source reliability (reliability), and the second cluster of relationships focusing on the
demographic variable, racial identity.

<table>
<thead>
<tr>
<th>Endogenous Variables</th>
<th>Type of Effect</th>
<th>Causal Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cognitive Access</td>
</tr>
<tr>
<td>Physical Access</td>
<td>Total Stan</td>
<td>.374</td>
</tr>
<tr>
<td></td>
<td>Direct Stan</td>
<td>.374</td>
</tr>
<tr>
<td></td>
<td>Indirect Stan</td>
<td>.000</td>
</tr>
<tr>
<td>Cognitive Access</td>
<td>Total Stan</td>
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<tr>
<td></td>
<td>Direct Stan</td>
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</tr>
<tr>
<td></td>
<td>Indirect Stan</td>
<td>.000</td>
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<tr>
<td>Reliability</td>
<td>Total Stan</td>
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<tr>
<td></td>
<td>Direct Stan</td>
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<td>Indirect Stan</td>
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<td>Relevance</td>
<td>Total Stan</td>
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<td>Direct Stan</td>
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<td></td>
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<tr>
<td></td>
<td>Indirect Stan</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 4.20: Summary of path analysis effects: total, direct, and indirect standardized effects, for the dependent variable: FSHIW: Web-based CMC (Bulletin boards/Chatrooms)

*Shaded areas indicate no effect between variables

For the AMOS-generated path analysis model with the dependent variable as frequency of seeking health information from Web, FSHIW, Web-based CMC (Bulletin boards/Chatrooms), the absolute measure of model fit, the chi-square value, is 21.894, which is smaller than the
chi-square value for the path analysis model discussed previously, FSHIW (websites). There are 26 degrees of freedom, and probability is non-significant (0.694). A non-significant chi-square test with a value that is very close to the number of degrees of freedom establishes that the researcher-defined path analysis model, the over-identified or reduced model, does not differ significantly from the ideal path analysis model, known as the just-identified or full/saturated model.

Relative measures of model fit are depicted in table 4.21 below. The observed values are close to, if not identical to the ideal values, thereby supporting the absolute model fit measure, the chi-square test. Once more, the path analysis model illustrating the causal chain of factors influencing how women seek health information on the Web from Web-based CMC (Bulletin boards/Chatrooms) exhibits excellent absolute and relative model fit.

<table>
<thead>
<tr>
<th>Measure of Model Fit</th>
<th>CMIN/DEF</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>ECFI</th>
<th>MECFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual value</td>
<td>0.842</td>
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<td>1.048</td>
<td>.000</td>
<td>.220</td>
<td>.225</td>
</tr>
<tr>
<td>Ideal value</td>
<td>&lt; 2-3</td>
<td>&gt; 0.9, =1.0</td>
<td>Close to 1.0</td>
<td>Close to 0</td>
<td>Smaller than saturated (.335) and independence (.648) models</td>
<td>Smaller than saturated (.346) and independence (.650) models</td>
</tr>
</tbody>
</table>

Table 4.21: Relative measures of model fit for path analysis for the dependent variable: FSHIW: Web-based CMC (Bulletin boards/Chatrooms)

The path analysis model diagram below includes all direct and indirect paths, their effect sizes and significance levels, as well as the R-squared value for the dependent variable, frequency of seeking health information from Web-based CMC (Bulletin boards/Chatrooms). This path analysis model comprises four information source variables, which are depicted
as solid rectangles above the dependent variable. Only perceived information source reliability directly influences the dependent variable, FSHIW (Bulletin boards/Chatrooms). The sole situational variable included in this model, family caregiving (caregiver role: total number of types of children by age group as caregiver dependents) is depicted with a dotted line rectangle and is placed below the dependent variable. The two demographic variables, household income (income) and racial identity are depicted with broken line rectangles and located to the left of the dependent variable, FSHIW (Bulletin boards/Chatrooms). The overall R-squared is 0.27, indicating that somewhat more than one-quarter of the variability in the model is explained by the study variables included in this model.

Figure 4.2: Path analysis diagram of factors affecting how women seek health information on the Web for the dependent variable: FSHIW: Web-based CMC (Bulletin boards/Chatrooms)
### 4.6.5 Path analysis of the model: FSHIW (Listservs/Newsgroups)

Table 4.22 below presents the non-parametric Spearman correlation matrix for the dependent variable; frequency of seeking health information on the Web, FSHIW, Web-based CMC (Listservs/Newsgroups). The correlation coefficients and significance levels are similar to that of the correlation matrix for the dependent variable, frequency of seeking health information on the Web, FSHIW, from Web-based CMC (Bulletin boards/Chatrooms).

<table>
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<tr>
<th>Model Variables</th>
<th>Measurement</th>
<th>Model Variables</th>
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<tr>
<td></td>
<td></td>
<td>FSHIW:</td>
<td>Physical</td>
<td>Access</td>
<td>Cognitive</td>
<td>Access</td>
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<td>Reliability</td>
<td>Family Caregiving</td>
<td>Racial Identity</td>
<td>Income</td>
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<tr>
<td></td>
<td></td>
<td>Listservs/ Newsgroups</td>
<td>Coef</td>
<td>Sign. (2-tailed)</td>
<td>Coef</td>
<td>Sign. (2-tailed)</td>
<td>Coef</td>
<td>Sign. (2-tailed)</td>
<td>Coef</td>
<td>Sign. (2-tailed)</td>
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<td>Sign. (2-tailed)</td>
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<td>.219</td>
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<tr>
<td>Listservs/</td>
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<td>.013</td>
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<td>-.012</td>
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<tr>
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<td>.113</td>
<td>-.248</td>
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<td>.008</td>
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<td>.463</td>
<td>.434</td>
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<td>.040</td>
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<td>53</td>
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<tr>
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<td>-.041</td>
<td>-.338</td>
<td>.040</td>
<td>1.000</td>
<td>-.147</td>
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</tr>
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<td>Sign. (2-tailed)</td>
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<td>.766</td>
<td>.011</td>
<td>.770</td>
<td></td>
<td>.201</td>
<td>.267</td>
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<td></td>
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<tr>
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<td>84</td>
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<tr>
<td>Income</td>
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<td>.229</td>
<td>.102</td>
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<td>-.051</td>
<td>-.147</td>
<td>1.000</td>
<td>.031</td>
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<td>80</td>
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<td>.031</td>
<td>1.000</td>
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<td>.074</td>
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<td>80</td>
<td>93</td>
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</tr>
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</table>
Table 4.22: Correlation Matrix for the dependent variable: FSHIW: Web-based CMC (Listservs/Newsgroups)

An examination of the correlation coefficients and their corresponding significance levels reveals that the most important relationships are found between perceived information source reliability (reliability) and perceived information source relevance (relevance), perceived information source accessibility (cognitive access), and the dependent variable, frequency of seeking health information on the Web, FSHIW, Web-based CMC (Bulletin boards/Chatrooms). As well, significant relationships are observed between the dependent variable and three of four information source variables, perceived information source accessibility (cognitive access), perceived information source relevance (relevance), and perceived information source reliability (reliability), and with racial identity. Household income (income) is significantly related to perceived information source reliability (reliability). Family caregiving role (number of types of children cared for by age group) is significantly related to perceived information source relevance (relevance). Overall, less than half of the 28 unique cells of the correlation matrix contain significant relationships.

The standardized regression weights, or path coefficients, are represented in Table 4.23 on the next page. In general, the values are similar to the correlation coefficients in the Spearman non-parametric correlation matrix, although effect sizes are not identical. As well, not all of the significant relationships in the correlation matrix are realized as significant path coefficients in the model.

The magnitude of the standardized regression weights for the relationships between information source variables are somewhat smaller than those observed for the Web-based CMC (Bulletin boards/Chatrooms) path analysis model. Conversely, relationships between
demographic variables and causal and dependent variables are larger than those observed for
the dependent variable, FSHIW, Web-based CMC (Bulletin boards/Chatrooms) path analysis model.

<table>
<thead>
<tr>
<th>Endogenous Variables</th>
<th>Antecedent Variables</th>
<th>Regression Weights</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical access (Listservs/Newsgroups) ← Cognitive Access (Listservs/Newsgroups)</td>
<td>.323***</td>
<td>.074</td>
<td></td>
</tr>
<tr>
<td>Cognitive Access (Listservs/Newsgroups) ← Reliability (Listservs/Newsgroups)</td>
<td>.479***</td>
<td>.081</td>
<td></td>
</tr>
<tr>
<td>Relevance (Listservs/Newsgroups) ← Reliability (Listservs/Newsgroups)</td>
<td>.441***</td>
<td>.081</td>
<td></td>
</tr>
<tr>
<td>Reliability (Listservs/Newsgroups) ← Racial Identity</td>
<td>-.325**</td>
<td>.327</td>
<td></td>
</tr>
<tr>
<td>FSHIW: Web-based CMC (Listservs/Newsgroups) ← Reliability (Listservs/Newsgroups)</td>
<td>.592***</td>
<td>.101</td>
<td></td>
</tr>
<tr>
<td>FSHIW: Web-based CMC (Listservs/Newsgroups) ← Family caregiving role (number of types of children cared for)</td>
<td>.203*</td>
<td>.182</td>
<td></td>
</tr>
<tr>
<td>FSHIW: Web-based CMC (Listservs/Newsgroups) ← Household Income</td>
<td>.279***</td>
<td>.187</td>
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</tr>
<tr>
<td>FSHIW: Web-based CMC (Listservs/Newsgroups) ← Racial Identity</td>
<td>.427***</td>
<td>.327</td>
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</tbody>
</table>

Table 4.23: Standardized regression weights for the dependent variable: FSHIW: Web-based CMC (Listservs/Newsgroups)

Significance levels: * p<.05; ** p<.01, *** p<.001; S.E. is the standard error

In table 4.24 on the next page, the decomposition of effects is presented. Total, direct, and indirect standardized effects, are noted. Overall, effect sizes are similar to those for the FSHIW, Web-based CMC (Bulletin boards/Chatrooms) path analysis model. However, they are somewhat smaller for all information source variables as endogenous variables, but larger, when the dependent variable is the endogenous variable. Again, it is evident that there are very few indirect effects in this path analysis model. Therefore, total effects are
attributable for the most part to the direct effects. Overall, the path analysis model comprises a small number of bivariate relationships of moderate strength and robust significance.

<table>
<thead>
<tr>
<th>Endogenous Variables</th>
<th>Type of Effect</th>
<th>Causal Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cognitive Access</td>
</tr>
<tr>
<td>Physical Access</td>
<td>Total Stan</td>
<td>.323</td>
</tr>
<tr>
<td></td>
<td>Direct Stan</td>
<td>.323</td>
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<tr>
<td></td>
<td>Indirect Stan</td>
<td>.000</td>
</tr>
<tr>
<td>Cognitive Access</td>
<td>Total Stan</td>
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<tr>
<td></td>
<td>Direct Stan</td>
<td>.479</td>
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<tr>
<td></td>
<td>Indirect Stan</td>
<td>.000</td>
</tr>
<tr>
<td>Reliability</td>
<td>Total Stan</td>
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<tr>
<td></td>
<td>Direct Stan</td>
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</tr>
<tr>
<td></td>
<td>Indirect Stan</td>
<td></td>
</tr>
<tr>
<td>Relevance</td>
<td>Total Stan</td>
<td>.441</td>
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<tr>
<td></td>
<td>Direct Stan</td>
<td>.441</td>
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<tr>
<td></td>
<td>Indirect Stan</td>
<td>.000</td>
</tr>
<tr>
<td>FSHIW: Web-based CMC</td>
<td>Total Stan</td>
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<tr>
<td>(Listservs/Newsgroups)</td>
<td>Direct Stan</td>
<td>.592</td>
</tr>
<tr>
<td></td>
<td>Indirect Stan</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 4.24: Summary of path analysis effects: total, direct, and indirect standardized effects, for the dependent variable: FSHIW: Web-based CMC (Listservs/Newsgroups)

*Shaded areas indicate no effects between variables*

For the AMOS-generated path analysis model with dependent variable as frequency of seeking health information from Web-based CMC (Listservs/Newsgroups), the absolute measure of model fit, the chi-square value, is 29.144. This value is similar to, but somewhat higher than the values for the two path analysis models discussed previously, FSHIW (websites) and FSHIW, Web-based CMC (Bulletin boards/Chatrooms). There are 25 degrees of freedom.
and a non-significant probability of 0.258. A non-significant chi-square test with a value close to the number of degrees of freedom demonstrates that the researcher-defined path analysis model is robust.

In terms of model fit measures other than chi-square, several values are summarized in the table 4.25 below. Observed values for relative measures of model fit, are close to, if not identical to perfect values, although not as close to perfection as the observed values for the FSHIW, Web-based CMC (Bulletin boards/Chatrooms) path analysis model. These values confirm the absolute model fit measure, chi-square test for this model. The path analysis model illustrating the causal chain of factors influencing frequency of seeking health information on the Web, FSHIW, Web-based CMC (Listservs/Newsgroups) exhibits excellent absolute and relative model fit.

<table>
<thead>
<tr>
<th>Measure of Model Fit</th>
<th>CMIN/DEF</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>ECVI</th>
<th>MECVI</th>
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</thead>
<tbody>
<tr>
<td>Actual value</td>
<td>1.166</td>
<td>0.959</td>
<td>0.941</td>
<td>0.025</td>
<td>0.255</td>
<td>0.260</td>
</tr>
<tr>
<td>Ideal value</td>
<td>&lt; 2-3</td>
<td>&gt; 0.9, =1.0</td>
<td>Close to 1.0</td>
<td>Close to 0</td>
<td>Smaller than saturated (.335) and independence (.581) model</td>
<td>Smaller than saturated (.346) and independence (.583) model</td>
</tr>
</tbody>
</table>

Table 4.25: Relative measures of model fit for path analysis for the dependent variable: FSHIW: Web-based CMC (Listservs/Newsgroups)

The path analysis model diagram includes all direct and indirect paths, their effect sizes and significance levels, as well as the R-squared value for the dependent variable, frequency of seeking health information from Web-based CMC (Listservs/Newsgroups).
This path analysis model comprises four information source variables, which are depicted as solid rectangles above the dependent variable, FSHIW. Only perceived information source reliability directly influences the dependent variable, FSHIW (Listservs/Newsgroups). The sole situational variable included in this model, family caregiving role (number of types of children by age group cared for) is depicted with a dotted line rectangle and is placed below the dependent variable, FSHIW (Listservs/Newsgroups). The two demographic variables, household income (income) and racial identity are depicted with broken line rectangles and located to the left of the dependent variable. The overall R-squared is 0.49, almost 50%, demonstrating that a respectable amount of the variability in this path analysis model is explained by the variables, much more so than the two path analysis models discussed previously, for FSHIW (websites) and FSHIW, Web-based CMC (Bulletin Boards/Chatrooms), respectively.

Figure 4.3: Path Analysis Diagram: Factors affecting how women seek health information on the Web for the dependent variable: FSHIW: Web-based CMC (Listservs/Newsgroups)
4.6.6 Summary of path analysis findings

Path analysis statistics demonstrate a clear and consistent pattern. The study variables included in each path analysis model, the paths outlining the relationships between study variables, and the strength of these bivariate relationships, are very similar for the three facets of the dependent variable, frequency of seeking health information on the Web (FSHIW). From the examination of several types of statistical output: cross-tabulations, scatter plot diagrams, and path coefficient effect sizes and corresponding significance levels, it is possible to describe in real terms, the nature of the three types of bivariate relationships observed: relationships between the dependent variable and study variables; relationships between information source variables, and relationships between demographic variables, in particular, racial identity, and perceived information source reliability, and the dependent variable, FSHIW, respectively. All relationships are described in detail in the following pages and are summarized in Table 4.26 on page 221.

There is a positive relationship between the two measures of perceived information source accessibility: cognitive access (The ease with which desired information is retrieved and read from the Web as an information source) and physical access (The amount of time and effort required to approach, contact, or locate the Web as an information source). This relationship is small in size but highly significant. When survey participants rate their perception of cognitive access as “very easy” or “easy”, they rate their perception of physical access to the Web as a source of health information as requiring minimal effort (“very little” or “little”). However, when cognitive access is rated as “difficult” or “very difficult”, a range of values from “very little” to “a great deal” is observed for physical access, indicating scatter in upper end of this bivariate relationship, which is more prevalent for Web as text-based content. Thus, a positive perception of
the ease of retrieving and reading health information from the Web generates a positive perception of the Web as an information source that is easy to approach. However, a negative perception of the ease of retrieving and reading health information on the Web elicits a range of perceptions of the ease of approaching the Web as an information source. This bivariate relationship between the two measures of perceived information source accessibility is only partially linear in nature.

There is a positive relationship between perceived information source reliability (Reliable health information is health information that is authoritative and dependable. Reliable health information is information that you can trust) and cognitive access (the ease with which desired information is retrieved and read from the Web as an information source). This relationship is very small for the first facet of the Web, websites, but intermediate in size and highly significant for the two Web-based CMC facets of the Web. Survey participants rate their perception of the ease of information retrieval and readability of health information from the Web as “very easy” or “easy” when reliability is perceived as “fairly reliable” or “very reliable”. When perception of the reliability of the Web as a source of health information is low (“somewhat reliable”, “unreliable”, or “very unreliable”), a range of values from “very easy” to “very difficult” is observed for cognitive access, indicating scatter in the upper end of this bivariate relationship, which is more prevalent for one face of the Web (websites). Thus, those who consider the Web to be a very reliable source of health information also find it very easy to retrieve and read health information from the Web. On the other hand, those who find the Web to be a very unreliable source of health information express a range of ratings concerning the ease of retrieving and reading health information from the Web, indicating that low reliability affects individuals differently.
There is a positive relationship between perceived information source reliability (Reliable health information is health information that is authoritative and dependable. Reliable health information is information that you can trust) and perceived information source relevance (Relevant health information is health information that is needed and useful with respect to your health and/or the health of those you care for. It is often considered to be comprehensive and timely). This bivariate relationship is moderate in size and highly significant for all three facets of the dependent variable, frequency of seeking health information on the Web. Survey participants rate their perception of the relevance of health information from the Web as an information source as “fairly relevant” or “highly relevant” when information source reliability is perceived as “fairly reliable” or “very reliable”. When perception of reliability is low ("somewhat reliable", “unreliable”, or “very unreliable”), slightly more participants rated perceived information source relevance as “very irrelevant”, “fairly irrelevant”, or “of some relevance”. However, there is a range of values for perceived information source relevance at both ends of the rating scale, indicating some scatter throughout this bivariate relationship, which is more prevalent for one face of the Web (websites). Overall, those who consider the Web to be a reliable source of health information also perceive it to be a relevant source of health information.

There is a positive relationship between perceived information source reliability (Reliable health information is health information that is authoritative and dependable. Reliable health information is information that you can trust) and the dependent variable, frequency of seeking health information on the Web, FSHIW. This relationship is consistently highly significant, but the effect size varies. It is weakly positive for one face of the Web (websites) but moderately positive for the two Web-based CMC facets. Survey participants rate the amount of time spent looking for health information on the Web as “less than an hour” or “1-2 hours” when information source reliability is perceived as “very unreliable” or “unreliable”. When perception of information source reliability is
moderate to high ("somewhat reliable", "reliable", or "very reliable"), a range of values from "never" to "over 10 hours" is observed for the dependent variable, indicating scatter in the upper end of this bivariate relationship, which is more prevalent for FSHIW (websites). Overall, those who consider the Web to be a reliable source of health information also spend more time searching the Web for health information. Those who perceive it to be an unreliable source of health information spend less time seeking health information on the Web. However, low reliability affects individual respondents differently.

There is a bivariate relationship between perception of reliability of the Web as a source of health information and racial identity. This relationship is weak when the dependent variable is FSHIW, Web-based CMC (Bulletin boards/Chatrooms), but intermediate in strength when the dependent variable is FSHIW, Web-based CMC (Listservs/Newsgroups). For both CMC facets of the Web, the significance level is robust. Caucasians assigned a range of values to Web-based CMC (Bulletin boards/Chatrooms), from very unreliable (3) to very reliable (1). For the second Web-based CMC facet (Listservs/Newsgroups), Caucasians assigned a range of values from "very unreliable" (2) to "fairly reliable" (13). Non-Caucasians rated both Web-based CMC (Bulletin boards/Chatrooms) and Web-based CMC (Listservs/Newsgroups) as "somewhat reliable" or "fairly reliable"; however, none rated the Web as "very unreliable" or "unreliable" as a source of health information. Overall, non-Caucasians had a more positive perception of the reliability of health information from Web-based communication sources than Caucasians.

Interest in this statistical finding must be tempered by the fact that only 93 of 264 survey respondents completed the racial identity question on the Web survey, and of those who did, the overwhelming majority (83%) were Caucasian (Europeans). While the minimum
sample size for relationship testing with a single predictor using correlation or regression analysis is 50 cases (Harris, 1985; Green, 1991), when the factors that influence statistical power are taken into consideration (alpha level, effect size, one-tailed versus two-tailed tests), to obtain .80 power, a larger sample size is required for a bivariate relationship with a small effect size and large significance or alpha level). According to Cohen and Cohen (1975), with an effect size of 0.30, 124 participants are needed to maintain 80% power.

The sample size for the relationship between perceived information source reliability (Web-based CMC: bulletin boards/chatrooms) and racial identity, which has an effect size of 0.336 and significant level of 0.017 for the two-tailed non-parametric correlation, is 50. For perceived information source reliability (Web-based CMC: Listservs/Newsgroups), which has an effect size for the non-parametric correlation of 0.312, with a significance level of 0.023, the sample size is 53. Clearly, these sample sizes achieve nominal power for relationship testing with one predictor, but when both effect size and significance level are taken into consideration, the statistical power of these relationships is less than the ideal value of 0.80.

A positive relationship is observed between an objective measure of health information need, calculated as the sum of ratings of severity (in terms of morbidity and quality of life indicators) of all personal health conditions, collapsed into two groups of values – high and low severity, and the dependent variable, frequency of seeking health information on the Web, FSHI(W) (websites). This relationship is small in size but highly significant. Those with high severity health conditions spend more time online seeking health information (six hours or more) than those with less severe health conditions (two hours or less),
40% versus 8%. However, proportionately the same number of respondents never sought health information on the Web; 4% of each group. Thus, severity of personal health conditions has some predictive value over the dependent variable, frequency of seeking health information on the Web, FSHIW, but only when the Web is conceptualized as content websites. Accounting for this finding is rather straightforward. It is reasonable to assume that high severity health conditions would be regarded with some degree of urgency by the individuals experiencing them, who would then intensify their information seeking in order to resolve these adverse personal situations.

There is a positive relationship between family caregiving and the dependent variable, frequency of seeking health information on the Web, FSHIW (websites). This bivariate relationship is weak in effect size and significance. Here, family caregiving is operationalized as an interval variable: the three-item self-esteem subscale of the 24-item Caregiver Reaction Assessment instrument developed by Given (1992). Survey respondents who gave this measure of caregiving a low rating used the Web (websites) infrequently (less than two hours per week), while those who rated it highly, were more likely to use the Web (websites) for three or more hours per week to find health information. When family caregiving is operationalized as total number of types of children (by age group) who are cared for by the respondent, a weakly positive relationship of modest significance is observed between this measure of family caregiving and the amount of health information seeking on the Web, FSHIW, Web-based CMC (Bulletin boards/Chatrooms) or Web-based CMC (Listservs/Newsgroups). A greater proportion of survey participants who have no children or children from one age group used these Web-based computer-mediated communication channels infrequently or not at all, compared to survey participants who have children from two age groups.
There is a positive relationship between the dependent variable, FSHIW, and racial identity. For two Web facets FSHIW (websites) and FSHIW, Web-based CMC (Listservs/Newsgroups), this relationship is intermediate in size and very significant. Many Caucasian participants spent at least one hour per week obtaining health information from websites, while non-Caucasians spent less than one hour per week or never sought health information from websites. For Web-based CMC (Listservs/Newsgroups), again, non-Caucasians spent less than one hour per week, or never sought health information from this type of Web-based CMC information source. In contrast, half of all Caucasians who completed this item used Web-based CMC (Listservs/Newsgroups), anywhere from less than 1 hour per week to over 10 hours per week. Overall, Caucasians are more likely to seek health information from the Web than non-Caucasians. It is not clear whether this finding can be attributed to barriers to access, cultural preferences, or to a lack of consumer health information in languages other than English on health information websites.

As was already mentioned for the relationship between racial identity and perceived information source reliability, the sample size for the non-parametric correlation between the dependent variable, FSHIW and racial identity meets the minimum requirement of 50 cases, with 67 cases for the relationship between racial identity and the dependent variable, FSHIW (websites), and 66 cases for the relationship between racial identity and the dependent variable, FSHIW, Web-based CMC (Listservs/Newsgroups), but not the desired sample size for maintaining an ideal statistical power of 0.80.

There is a positive relationship between current occupation and the dependent variable, frequency of health information seeking on the Web, FSHIW (websites). This relationship is
small in size but highly significant. A greater proportion of participants who are not employed in the healthcare sector use the Web infrequently or not at all, in comparison to participants who are employed in the health care sector. Those employed in the healthcare sector are twice as likely to be frequent users of the Web to find health information (more than six hours per week). Being employed in the healthcare sector is associated with higher use of the Web to find health information from websites. Explanations supporting the plausibility of this relationship are delineated in section 5.7.6.2 of the Discussion Chapter.

There is a positive relationship between household income and amount of health information seeking on the Web, FSHIW (Web-based CMC). This relationship is small in size but highly significant. A greater proportion of low-income survey participants used these Web-based information sources infrequently or not at all to find health information online, while a greater proportion of participants with a household income of $50,000 or more used Web-based bulletin boards/chatrooms or listservs/newsgroups for three or more hours per week to find health information. Overall, higher household income predicted greater use of Web-based communication sources to find health information. However, the number of participants who used Web-based CMC to find health information online was altogether small in this study, resulting in insufficient statistical power. This finding is supported by results from the Statistics Canada General Social Survey conducted in 2000 (Dryburgh, 2001). Only 16% of Canadian Internet users stated that they subscribe to a listserv or newsgroup, with a substantially higher percentage of men (20%) than women (11%), and higher income earners (21%).
<table>
<thead>
<tr>
<th>Bivariate relationships</th>
<th>Path Analysis Models</th>
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<tbody>
<tr>
<td></td>
<td>Content Websites</td>
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<tr>
<td>Absolute fit (chi)</td>
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<td></td>
<td>29.14, 0.26</td>
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<td>$R^2$</td>
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<td>Information source variables</td>
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<td>Cognitive access → Physical access</td>
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</tr>
<tr>
<td>Perceived information source reliability → Cognitive access</td>
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</tr>
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<td>Personal situation variables</td>
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<td>Family caregiving (Self-Esteem) → FSHIW</td>
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<td>Demographic variables</td>
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<tr>
<td>Racial identity → FSHIW</td>
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<tr>
<td>Income → FSHIW</td>
<td>-</td>
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<tr>
<td>Occupation → FSHIW</td>
<td>0.31, 0.000</td>
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Table 4.26: Summary of effect sizes and significance levels of bivariate relationships for path analysis models of three facets of FSHIW
4.7 Chapter summary

In this chapter, the statistical analysis of the survey questionnaire data was presented, including descriptive statistics, cross-tabulations, correlation analysis, and path analysis. Three path analysis models were tested for model fit. The effect sizes and p-values of paths representing relationships between study variables, as well as other variables such as demographic variables, were detailed. Table 4.26 on the previous page presents a summary of all significant relationships for the three facets of the Web. In the next chapter, hypothesis testing based on the path analysis models, excerpts from in-depth interviews with study participants, and relevant and current published studies are described.
5.1 Chapter overview

In the Results Chapter, the analysis of the Web survey data was presented in detail. First, descriptive statistics for all study variables were described. Paired t-tests and repeated measures analysis of variance compared thirteen types of information sources according to accessibility (physical access and cognitive access) and quality (relevance and reliability). Most importantly, statistics that examine and test relationships between study variables, including cross-tabulations, non-parametric correlations, multiple regression, and path analysis, were described.

Three models of women seeking health information on the Web based on path analysis for each of three facets of the Web (Figures 4.1, 4.2, 4.3) were presented in the Results Chapter. These models posit a central role for information source reliability as a predictor of this Web use behaviour, although the relationship between perceived information source reliability and the dependent variable, frequency of seeking health information on the Web (websites) was weak, surpassed by demographic variables (racial identity and occupation) and health information need. This finding suggests that factors associated with the consumer health domain (health information needs measured objectively in terms of severity of personal health conditions and employment in the healthcare sector) took precedence for health information seeking on the website content facet of the Web, which can be regarded as the encyclopedic component of the Web.
Analyses of the survey data were presented in Chapter 4: Results. As discussed in Section 4.7.1 (p. 148 -150), multiple regression analyses based on the initial theoretical model found very few independent variables that were directly related to the dependent variable. Instead of regression, path analysis was used to explore the relationships between the research variables, and this led to a set of data-driven models that was presented in Section 4.7. In this chapter, we return to the original study hypotheses, reporting and discussing the results in relation to three sets of data: results from statistical analysis of the survey data; relevant excerpts from the interview data that contextualize the survey results, and comparable research findings reported in the journal literature.

This chapter also details the limitations of this study. Furthermore, in the section on implications for future research, suggestions concerning the measurement of study variables are made; additional variables for study are proposed; different study populations are mentioned, and a new perspective on information source characteristics for the Web 2.0 environment is presented.

5.2 Objective

The purpose of this study is to develop an information-seeking-in-context theoretical framework of women’s health information seeking on the Web that recognizes the importance of information source characteristics and Web users’ perceptions of their ability to use the Web as an information source (Web self-efficacy) while being grounded in the context of women’s everyday lives (health information needs, family caregiver status and experience) and identity (socio-demographics). The Web is conceptualized as a vast, global electronic information source with two distinct components: static, text-based content for the delivery of factual information (websites) and communication channels (CMC) that deliver asynchronous messages from individuals or groups for information exchange and social support (Bulletin boards/Chatrooms; Listservs/Newsgroups).
5.3 Research question

The global research question for this study was articulated as follows: What are the relative influences of information source characteristics, situational factors, and demographics on the intensity of seeking health information on the Web by women?

5.4 Study variables

One focus of this multi-method exploratory study on women seeking health information on the Web is hypothesis testing of proposed bivariate relationships between the dependent variable, frequency of health information seeking on the Web, FSHIW, and five causal factors, which are examined as seven individual predictors. The independent variables under consideration are: amount of uncertainty associated with health information need (personal health conditions); family caregiving (status, role, and experience), Web self-efficacy, and perceived quality and accessibility of Web-based information sources for seeking health information on the Web. Both information source factors are considered respectively as two-faceted constructs, as commonly studied in the field of library and information science. Perceived information source quality is defined further as perceived information source relevance and perceived information source reliability, while perceived information source accessibility is distinguished further as perceived physical access and perceived cognitive access. Seven demographic variables were also investigated: chronological age, household income, education, marital status, language, racial identity and geographic location. All variables were measured as one or more items in a seven-part Web survey questionnaire, which was completed by 264 study participants. Survey data collection was completed by mid-April 2001, and other components were completed by the end of May 2001.
5.5 Overall findings

In general, study hypotheses are not supported, with a few exceptions. The findings for information source characteristics are mixed. There is a key role for perceived information source reliability (perception of the reliability of the Web as a source of health information) in relation to the dependent variable, frequency of seeking health information on the Web, as predicted. As well, perceived information source reliability influences perceived information source relevance (relevance of health information on the Web), a novel finding. These findings pertaining to information source quality are consistently observed for the three conceptualized facets of the Web: website content (websites), Web-based CMC (Bulletin boards/Chatrooms) and Web-based CMC (Listservs/Newsgroups). However, perceived information source relevance did not affect the frequency of seeking health information on the Web, an unexpected negative finding, given the strong relationship between these two variables in the Women in IT study (Marton and Choo, 2002). It also stands in contrast to the discovery of a strong role for situational relevance from qualitative interview data concerning study participants’ selection of health websites and their ratings of these websites.

Situational relevance is identified a posteriori in this study as a fine-grained dimension of topical relevance. For the subgroup of study participants who have chronic mental health conditions, situational relevance is seemingly linked to affective relevance. The information retrieved from the Web must satisfy the need for emotional support and affirmation. Participants obtained this kind of experiential information about personal illness from personal websites and from messages posted on CMC channels, both of which are authored by those who experience the same mental health conditions as this group of study participants and who want to share their illness experience online.
Hypotheses predicting positive influences for Web self-efficacy and perceptions of information source access (physical access and cognitive access), respectively, on frequency of seeking health information on the Web, FSHIW, are not supported. However, several novel findings were uncovered. Perceived information source reliability has a positive effect on perceived information source access (cognitive access), which, in turn, exerts a positive influence on perceived information source access (physical access). Strength of Internet Experience, a post-study composite measure, positively influences frequency of seeking health information on the Web, FSHIW. However, since this variable does not contribute much to the path analysis models in with respect to r-squared or model fit, it was not included in these models. It should be noted that similar measures in the Pew Institute studies on health information seeking online are significant variables in multiple regression studies conducted by Rice (2006). Therefore, this variable may be an important contributor if operationalized differently.

With respect to contextual variables, uncertainty associated with health information need arising from personal health conditions does not affect frequency of health information seeking on the Web, FSHIW. However, a post-study objective measure, severity of personal health conditions, exerts a positive influence on one facet of the dependent variable, FSHIW (websites). Furthermore, although caregiver status does not affect frequency of seeking health information on the Web, family caregiver role, both in terms of number of type of children cared for, and caregiving experience (self-esteem subscale only), exerts a weak influence on the frequency of seeking health information on the Web.
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<thead>
<tr>
<th>No.</th>
<th>Hypothesis Statement</th>
<th>Research Finding</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Content Websites</td>
</tr>
<tr>
<td>H1</td>
<td>Amount of uncertainty associated with health information need is positively correlated with the intensity of health information seeking on the Web.</td>
<td>Not supported</td>
</tr>
<tr>
<td>H2</td>
<td>Family caregiving (caregiver role and experience) is positively correlated with intensity of health information seeking on the Web.</td>
<td>Weakly supported</td>
</tr>
<tr>
<td>H3</td>
<td>Web self-efficacy is positively correlated with the intensity of health information seeking on the Web.</td>
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</tr>
<tr>
<td></td>
<td>*Post-hoc measure, Strength of Internet Experience is weakly supported</td>
<td>Supported</td>
</tr>
<tr>
<td>H4</td>
<td>The perceived quality of Web-based information sources is positively correlated with the intensity of their use in health information seeking.</td>
<td>Quality 1: Relevance</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Supported</td>
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<tr>
<td>H5</td>
<td>The perceived accessibility of Web-based information sources is positively correlated with the intensity of their use in health information seeking.</td>
<td>Physical Access</td>
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<td>Not supported</td>
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Table 5.1: Summary of hypothesis testing of survey results
Three demographic variables: racial identity, household income, and occupation, are also significantly related to at least one of the three facets of the dependent variable, FSHIW, with racial identity identified as an influential variable for all three facets of the Web. These findings lie outside of the original conceptual framework and study variables. While interesting, and the focus of considerable research on the digital divide, they are subject to interpretation given the over-representation of European Caucasians and the under-representation of several visible minority racial groups in this study (South Asians, Afro-Caribbeans and Africans) relative to the population of Toronto, according to the 1996 Census of Canada.

Table 5.1 on the previous page presents a summary of the survey results in terms of hypothesis testing of the relationships between the independent variables and the dependent variable, frequency of seeking health information on the Web, FSHIW, for each of the three facets of the Web.

5.6 Study participants

Multi-method studies, also referred to as mixed method studies, include both quantitative and qualitative components. The type of mixed study design is characterized by the relationship between these components. Creswell and Plano Clark (2007) differentiate between four types of mixed methods designs, each with variants that formulate a specific research question. This study can be regarded as an embedded correlational design with the research question, “How does the qualitative data add to an understanding of the mechanisms in the correlational model” (p. 106). However, it can also be viewed as an explanatory design with follow-up explanations, where the research question is articulated as follows, “In what ways do the qualitative data help to
explain the quantitative results?” (p. 106). For these two types of multi-method designs, there is an understanding that the qualitative dataset is embedded within the primary quantitative dataset, and performs a supplemental role. The priority of the study is weighted in the direction of the quantitative component. This positioning of the qualitative dataset stands in contrast to other types of mixed methods design, namely, the triangulation design, where both quantitative and qualitative components have an equal contribution, and the exploratory design, where the qualitative component is primary and the quantitative component is secondary. Here, the primary component is the survey, which generated a large data set for the purpose of testing a theoretical model with analytical variables that were thought to characterize the behaviour of women seeking health information on the Web. Statistical analysis of survey data enables, to some extent, generalization from the convenience sample to the population. In contrast, the qualitative component used purposeful sampling to obtain a deeper understanding of this behaviour (Brewer and Hunter, 2006). For this study, the qualitative sample was derived from the survey sample.

Following the completion of the detailed Web survey questionnaire, twenty-seven of the 264 survey participants completed at least one of the other study components, beginning with interview one, on health status and family caregiving, and ending with interview two, on Web use sessions for seeking health information online, after the WebTracker log files and Web use journals had been collected. According to Boyatzis, (1998, p. 41), “the material to be coded must represent a subsample of two or more specific samples used in the research.” The twenty-seven participants can be grouped into three categories according to personal health status: those with chronic mental health conditions (n=5), those who have chronic physical health conditions (n=11), and those who are predominantly healthy (n=11),
The mental health subgroup was selected as a subsample of the qualitative component of this multi-method (mixed methods) study for detailed analysis because this subgroup is relatively homogeneous according to health status. This homogeneity was lacking in the other two interview subsamples. The individuals in the chronic health conditions subsample displayed a heterogeneous range of health conditions that defied classification by health condition while the individuals comprising the healthy subsample were characterized as having acute health conditions of short duration. These healthy individuals did not spend much time online seeking health information because there was little need for them to do so. Therefore, interview data from this subsample was lacking in detail on the phenomenon being studied.

Homogeneous sampling is an established form of purposeful sampling in qualitative research. This theory-based sampling strategy is characterized by finding examples of a theoretical construct and examining it and elaborating on it (Creswell, 2007, p. 127). The units of study are individuals and the variables being studied are those characteristics of individuals included in the theoretical model: perceptions of the Web as a source of health information; health information need, family caregiving, Web self-efficacy, and demographic variables. Reliability, the consistency of the interview data, and validity, the ability of the research instrument to measure what it is intended to measure, are key concerns in qualitative research (Keats, 2000). Reliability was achieved by adhering to the pre-determined wording of interview questions and their order of presentation. Construct validity was achieved by ensuring that the interview questions were closely linked to the constructs in the theoretical model. Face validity was achieved in that the participants displayed ready understanding of the interview questions and their purpose.
For qualitative research, sample size considerations are based not on achieving generalizability but obtaining extensive detail for theoretical saturation. The key criterion is that all participants in the qualitative sample have experience with the phenomenon under study (p. 128). According to Sandelowski, “purposeful sampling for demographic homogeneity and selected phenomenal variation is a way a researcher working along with limited resources can reduce the minimum number of sampling units required within the confines of a single research project, but still produce credible and analytically and/or clinically significant findings.” (p. 182). Morse (1994) as cited by Sandelowski (1995) suggests a sample size of six participants for qualitative research on phenomenologies that attempt to fully describe the characteristics of a specific behaviour or experience.

While the sample size of five study participants comprising the chronic mental health conditions subsample falls somewhat short of Morse’s recommended sample size, the richness of the interview data found in this interview subsample enabled theoretical saturation. Thematic analysis of the interview transcripts revealed the dimensions of the study variables and provided insight into the contributions of several demographic variables found to be statistically significant in the survey data, such as occupation, ethnoracial identity, and to some extent, household income. A brief examination of the interview data from the other two subsamples enabled the researcher to conclude that similar findings were present to varying extents, but no further unique findings would be generated by analyzing the interview transcripts from these subsamples.

Further support for the decision to analyze solely the interview data from the mental health subsample comes from the immense importance of mental health conditions to society, and the gendered nature of mental health conditions. According to the National Institute of Mental Health (2010), mental disorders are common in the United States and globally.
Approximately one in four adults is estimated to suffer from a diagnosable mental disorder in a given year. Mental illness is leading cause of disability in the U.S. and Canada for individuals between the ages of 15 and 44. Depression is the leading cause of disease-related disability among women, and its prevalence among women is twice that of men (Stewart, 2008). It is predicted to become the second leading cause of disease-related disability worldwide by 2020. Yet depression is under-identified and inadequately treated (p. 1023).

Many mental health researchers have noted that mental illness is stigmatizing and isolating (Dinos, Stevens, Sefaty, Weich, and King, 2004; Crisp, Gelder, Rix, Meltzer and Rowlands, 2000). Those experiencing mental illness may not utilize mental health services. Internet websites may be a useful tool for conveying mental health information to those who are isolated by mental illness and who remain untreated.

Noteworthy in this study of women seeking health information on the Web is the observation of the co-existence of mood disorders and eating disorders in each of the five participants with mental health conditions, lending credence to the clinical finding of the gut as the so-called “second brain” or “brain-gut connection” (Gershon, 1998; Toner, Zindel, Emmott, and Myran, 1999; Vastag, 2003; Jones, Dilley, Drossman and Crowell, 2006).

The in-depth study components were implemented together and to some extent were inter-related. As mentioned previously, two in-depth, semi-structured interviews were conducted, on personal health status and family caregiving, and on Web use for health information seeking, respectively. As well, unobtrusive Web monitoring software (WebTracker) was installed on these participants’ computers with their consent, commonly the desktop computer at home. Installation of WebTracker was done on the computers of
twenty-three of the twenty-seven participants immediately after Interview 1 ended. WebTracker was designed to capture the URLs of websites visited and the dates and times they were accessed, as well as Web browser actions utilized by participants during their sessions of Web use for finding health information online. However, only seven completed sets of WebTracker log files were collected due to problematic interactions between the WebTracker software and both the operating system and Internet browser on participants’ computers. As well, several participants forgot to turn on WebTracker while searching for health information on the Web during the timeframe of this study.

Those twenty-seven participants who completed Interview 1 also completed a set of structured sheets provided by the researcher, which collectively comprise a journal of the Web use sessions and ratings of all health websites visited during each session of using the Web to find health information. However, many Web use journals were incomplete because participants did not rigorously list all health websites visited in each session, and several study participants noted that completing this component of the study adversely affected their natural Web use and online information seeking behaviour.

Despite these difficulties, the additional study components provide the researcher with an in-depth, fine-grained understanding of the personal contexts of the participants’ health information seeking behaviour, which largely support quantitative findings obtained from hypothesis testing of Web survey variables, as well as uncovering the important role of situational relevance of the content of health websites. Patterns of computer and Web use unrelated to hypothesis testing, including Web search engine preferences, site navigation, use of Web browser buttons, and bookmarking and printing habits, were also captured.
Quantitative findings derived from hypothesis testing are supplemented by excerpts from the interview transcripts of a subset of the twenty-seven participants who completed both interviews and most if not all of the other components of this study. This group comprises five participants: three European-Canadians, one Chinese-Canadian, and one Taiwanese-Chinese visa student. All five experience chronic mental health conditions, both mood disorders (depression or bipolar disorder) and disordered eating (anorexia or over-eating).

Recognizing the sensitive nature of women’s experiences with mental health conditions and their life stories, anonymity is assured by omitting their names. Instead non-descript labels (part1-part5) are used to refer to these participants anonymously. Each individual is described in terms of their personal health status and caregiving experiences up to and including the timeframe of the study. Detailed profiles of the health conditions and Web use patterns of these five individuals provide a rich contextual understanding of their personal circumstances and the broad characteristics of their online health information seeking sessions and preferences. These profiles are located in Appendix C.

5.7 Hypothesis Testing

5.7.1 Health information need and uncertainty

Hypothesis 1: The amount of uncertainty associated with health information need is positively correlated with the intensity of health information seeking on the Web.

This hypothesis is rejected. Perceived uncertainty associated with health information need does not influence the frequency of using the Web to find health information.
5.7.1.1 Bivariate relationship between health information need and seeking health information on the Web

Contrary to what was predicted based on a review of the literature on theories of information seeking behaviour, notably that participants' perception of higher uncertainty would be associated with greater frequency of health information seeking on the Web, FSHIW, this relationship was not found.

However, when survey respondents' personal health conditions were objectively ranked post hoc, in terms of severity, using mortality and morbidity as indicators of severity, a weakly positive influence was observed between severity of personal health conditions and frequency of seeking health information on the Web, but for one facet only (websites). Survey respondents with high severity health conditions (in terms of morbidity and mortality) spent more time online seeking health information (six hours or more) than those with less severe health conditions (two hours or less). However, proportionately the same number of respondents never sought health information on the Web. Personal health status, in terms of severity of personal health conditions, is a positive but weak predictor of frequency of seeking health information from the Web, FSHIW, for one facet of the Web only (websites). The lack of a relationship with Web-based computer-mediated communication channels may be attributable to the overall limited use of CMC channels among participants in this study. In other words, it is conceivable that small sample size for this questionnaire item (frequency of use of Web-based CMC) provides only nominal power for statistical testing, instead of desired power of 0.80. It is also plausible that more work is required to develop and test an appropriate measure of health status, as a proxy for health information need, for research on health information seeking on the Web.
5.7.1.2 Interview excerpts pertaining to health conditions and health information needs

Interview transcripts from the five study participants with chronic mental health conditions, referred to in the following pages by anonymous labels, Part1-Part5, provide detailed and articulate descriptions of their personal health conditions at the time of this study. Excerpts describing participants' experiences with mental health conditions are presented as follows.

Part1

I have an eating disorder and I have had an eating disorder for about seven or eight years now. I have used... I have been in treatment in the past and I would call myself in the fragile recovery stage doing much, much [emphasis] better than I was eighteen months ago. [I am] able to work, [to] function, that sort of thing. But, it's fragile and tenuous. So I'm not totally [emphasis] thrilled [with] where I am, because, of course, I want it over. But [emphasis] it's, I think... I'm probably going through a normal recovery pattern. And so I am... I still see my GP for weight monitoring and medication and I go to a group [session] once a week.

Part2

I've seen several psychia[trists]. Like, I've also seen other referrals, like to the Clarke, or whatever, and it's differed. I think he originally said, just chronic dysthymia, with episodes of chronic depression. But I think it's more chronic depression over-laden with episodes of dysthymia...

Part3

Current problems are: I'm in treatment for clinical depression and, as of last week, I am about to... I have something.... a lump in my breast, and I am in the process of getting that checked out. I have an eating disorder with no symptoms, or that's what she calls it. I don't have an official [officially diagnosed] eating disorder, but I don't eat much. My diet is not healthy, and it does not consist of much. In a day I'll probably eat one meal.

Part4

It's really depression, that's what my original diagnosis was. But about two years ago, it was sort of, upon consultation with, sort of, a new doctor, he, kind of, thought that maybe it was more depression and a mood disorder, like nothing... no label for the mood disorder, maybe, but just that I had not so much... Like, if anything, it'd be closer to
Bipolar, I believe it's [called] Bipolar 2, which basically means your ups and downs are not as pronounced as sort of the stereotypical mania, deep, deep depression. I mean, I'm on anti-depressants, but also, like, a mood stabilizer. But I would still characterize my illness as generally depression. So, I've been very satisfied with the kind of care that I've gotten.

…… but I finally feel like I found, sort of, a plateau where I'm satisfied with the results of what the medication does, and, you know, I'm not suffering from any side effects that impede high function every day.

Part5

And basically, I'm trying to lose weight, as well as I'm taking some medicine from her [TCM practitioner], herbal medicine. It's just about depression stuff, and my doctor just told me that, "You are just having too much stress from school."

The interview transcripts presented above reveal that study participants with mental health conditions are concerned with obtaining the correct diagnostic label for their specific conditions and that initial diagnostic labels may be revised. Also, it is evident that they struggle with these conditions and that the severity of these conditions is variable. Current treatments are also mentioned.

5.7.1.3 Published studies on health conditions, health information needs and seeking health information on the Web

Since the Web became a mainstream technology in the late 1990s, over 100 journal articles on health information on the Internet have been published in the health sciences literature. Many research studies on consumer health on the Web, which includes studies on health information seeking on the Web, cover specific health conditions. The studies presented below generally show that health information seeking is prompted by concern over personal health conditions. Thus, it may be inferred that health information needs are reflective of personal health status.
Research examining the relationship between health information need and intensity of seeking health information on the Web does not exist explicitly. However, two studies have examined this relationship in somewhat similar ways. Leung (2008, p. 7), who conceptualized health information need slightly differently as health information seeking online (medical treatment; hard to talk about health issues) family health, health improvement) found small but significant bivariate relationships between this variable and the dependent variable, Internet embeddedness. As well, he observed a robust and highly significant correlation between health information seeking online and Internet usage intensity (.37, sign. = 0.001), which supports the finding of a bivariate relationship between health information need and frequency of health information seeking on the Web in this study. Similarly, Rice's analysis of Pew studies on health information seeking online conducted in 2000-2002, approximately the same time frame as this study, also confirm bivariate relationship between health information need, operationalized as follows: Multiple specific health reasons; In last 2 years, dealt with own major illness/health condition; In last 2 years, helped another deal with major illness/health condition; and several dependent variables, and, more importantly, its significant contribution to multiple regression models (pp. 25-26).

Research findings presented in the journal literature on health information seeking on the Web (Gammon and Rosenvinge, 2000; Meischke, Bowen and Kuniyuki, 2001, Kummervold, Gammon, et al., 2002; Markman, Markman, et al., 2006; Hausner, Hajak, and Spiesl, 2008) conclude that those seeking health information online pertaining to their individual health conditions regard the Web as a useful source of both factual information and social support. Christensen and Griffiths (2000) succinctly identified the value of mental health websites in general as follows, “The Web, due to its accessibility, has advantages in providing access to information, online therapy and adjunctive therapy in mental health. Problems include information overload, poor information quality, potential harm and lack of scientific evaluation.” (p. 975).
Powell and Clarke (2006) identify the primary motivation of seeking mental health information online as finding experiential information from others with similar problems. This kind of information is reassuring to users of mental health websites.

Findings from the 2005 Canadian Internet Use Survey on use of the Internet to access health information confirm earlier Statistics Canada and Pew Research Institute data. According to Underhill and McKeown (2008), many Canadians (58%) who access the Internet from home find health information online. When CIUS survey respondents are divided into three groups according to their reported pattern of Internet use, almost 35% (8.7 million) can be defined as health users, while 25% (6.2 million) use the Internet for other purposes, and 32% (7.9 million) are classified as non-users as they do not use the Internet for personal reasons or are not current users. The profile of so-called health users in the CIUS study has several demographic characteristics: predominantly female (55%); married (56%); university educated (32%); employed (74%); children younger than 18 (42%); urban (82%), and a household income of greater than $80,000 (43%). Thus, higher education and income are predictors of using the Internet to find health information. As well, health users were more likely to be heavy Internet users and to undertake many online activities and have been online for at least five years. Multivariate analysis of the survey data demonstrated that the number of online activities, which the authors term “breadth of use” is the primary predictors of using the Internet to find health information.

Of particular interest in relation to this study of women seeking health information on the Web and the study variable of health information need, Canadian Internet users polled in the 2005 Statistics Canada CIUS survey who were categorized as health users most commonly searched for information on specific diseases (56%), while half of this group searched for
health information on lifestyle factors, such as diet, nutrition, and exercise. Other frequently searched health topics were specific symptoms, drugs or medications, and alternative therapies. Age and sex were determinants of the type of health information sought, with young and middle-aged health users looking for lifestyle and healthcare system information, while those 45 and older expressing more interest in health information on specific diseases and on drugs and medications, revealing a relationship between age-related health status and choice of health topic searched online. Gender differences were also uncovered. *Women were more likely to seek health information about specific diseases than men.* Regional differences in health topics searched online show that people in British Columbia are interested in alternative therapies while in Quebec people are interested in specific diseases and in the Maritimes, people are interested in lifestyle and drugs and medications. Searching for health information online did not displace asking healthcare practitioners for health information. In fact, slightly more than one-third (38%) of health users discussed the health information they found online with their physician, in particular, those looking for information online about surgeries. This finding suggests that severity of personal health condition (poor health status) prompts health information seeking online as well as obtaining health information from healthcare practitioners.

### 5.7.1.4 Summary of findings on health conditions, health information needs and seeking health information on the Web

In summary, a weak, positive relationship between the study variable health information need and the dependent variable, frequency of seeking health information on the Web (websites) was observed when this study variable was measured objectively as severity of personal health conditions, but not when it was measured subjectively as uncertainty associated with health information need pertaining to personal health conditions.
Interview transcripts and research studies, in particular, a study of health information seeking on the Web conducted by Leung (2008) and Rice’s analyses of the Pew studies on health information seeking online from 2000-2002 (2006), lend support to this finding. Clearly, health information needs reflect concerns with current health conditions and lead to health information seeking on the Web.

5.7.2 Family Caregiving Role and Experience

Hypothesis 2: Family caregiving is positively correlated with intensity of health information seeking on the Web.

Being a family caregiver (caregiver status) in and of itself does not influence the frequency of seeking health information on the Web. However, when caregiving is examined at a finer level of granularity, as caregiver role and caregiving experience, a modest influence on frequency of seeking health information on the Web was observed. Family caregiving was conceptualized both in terms of the number of type of care recipients (caregiving dependents), a seemingly complicated measure, and in terms of caregiving experience, which was measured using the subscales of the 24-item Caregiver Reaction Assessment instrument developed by Given and Given (1992).

5.7.2.1 Bivariate relationship between family caregiving and seeking health information on the Web

Study results reveal that the number of type of children (by age group), but not the number of type of adults cared for, has a modest positive effect on the frequency of use of CMC channels for seeking health information online. Furthermore, the three-item self-esteem subscale, the sole measure of the positive aspects of family caregiving in the Caregiver Reaction Assessment instrument, positively affects the frequency of seeking
health information on the Web, but solely for one facet of the Web (websites). Because measurement of caregiving was restricted to family caregiving, and thus did not take into consideration caregiving for friends, only a small number of survey respondents self-identified as caregivers. It is conceivable that the modest relationships observed in this study would in fact be larger in studies where more participants are caregivers. Broadening the definition of caregiving is advisable, given that caregiving for friends was identified as an important role in study interviews, in particular, for young women whose social circle understandably focuses on peer relationships, much more so than relationships with family members. Failure to capture this type of caregiving is an oversight in this study.

5.7.2.2 Interview excerpts pertaining to family caregiving and seeking health information on the Web

Interview data from study participants reveal primarily positive attitudes towards family caregiving experiences. Although this subgroup of five study participants with mental health conditions has significant needs of their own, they are genuinely interested and willing to help family members and friends. However, several exceptions are evident. Four are young women who, understandably because of their age, have not had significant caregiving experience. Two interviewees mentioned negative experiences. For Participant 1, one care recipient is a sister with cognitive impairment from a brain injury, who requires ongoing care and does not always understand or remember the health information given to her. For Participant 4, the caregiver role was forced upon her under extenuating circumstances, no training was provided beforehand, caregiving involved hands-on physical as well as emotional care, and the care recipient, a suicidal roommate, did not appreciate the care provided to her, instead, she was openly resentful.

It is understandable that caregiving can be perceived negatively when the duration of
caregiving is long-term or the nature of caregiving is exhausting and/or unappreciated. Also included are descriptions of positive caregiving experiences that involve low-key activities such as cooking, counseling, assistance with mobility, and information provision. Participant 1 provides consumer health information to her elderly mother, a former librarian, who understands it and values her daughter’s knowledge as a nurse. Participant 2 provided short-term caregiving to her father when he broke his hip and is generally helpful to her friends, listening to their difficulties and cooking for them, while Participant 5 has provided some assistance to her elderly grandmother in Taiwan. Excerpted from the interview data are relevant quotes pertaining to both positive and negative caregiving situations, as follows.

Part 1

OK, so we’ll do [discuss] my mother first. Mostly what I do is support and information. My mother’s also the queen of information and gets tons of information. But sometimes it’s validating it for her; referring her to sources that I found to be good. As a nurse she’ll trust what I say so she’ll come to me and say, you know, “I went to the doctor and they said this. What does that mean?” Or whatever, and, “where can I get more information?” So I’ll refer her to some resources. She has a problem with arthritis, so a lot of it is related to her arthritis. For example she went through the whole, “should I take glucose-[amine/amide] or not?” And so we did a lot of sort of searching on that.

She [older sister] had a motor vehicle accident with a head injury around ten years ago, eleven years ago. It will be eleven years next week. And she’s just got all sorts of little things. Nothing sort of related to the head injury anymore, we’re sort of well past that stage, but, because I’m a nurse, any time a health issue comes up, she emails me about it and wants an answer.

Part 2

About 10 or 11 months ago my father fell and broke his hip and his pelvis, or something. And I had just come home from university, so I did some caretaking when [he] came out of the hospital eventually. Preparing his meals, fetching things for him, helping him with his exercises, fluffing pillows, stuff like that, and making sure that he got the proper meals like high calcium foods and things like that.
... it was friends and roommates and stuff. If they were sick, like, I bake a lot and cook a lot, so I would... like, I usually feed [the] people I live with [laughing]. They like it. If they are sick I just take care of them and stuff. Hold their hand when they're throwing up, stuff like that. Counseling, I actually did that because, yeah, I did a lot of counseling with friends.

Part4

So being caregiver for her [suicidal roommate] was extremely bad. And she was very manipulative. I don't think she meant to be. But she'd call me from the hospital. I would just sit with her; she would not talk to me. I would just sit next to her, like we're sitting now, and she didn't have anything to say because they [the hospital] had no activities [for mental health patients], she had nothing [to do], and she was angry with me. But I would just sit with her, just to try and show her that I care. And I'd bring her stuff, you know, and she'd be like, "Bring my cigarettes" and I'm like "Yeah, forget that" [laughing] because she took up smoking. ...... I was so drained, and upset by all the stuff that had happened, like it was just, it was way too much.

Part5

My grandmother is [in Taiwan]. She's now ninety-something, and she hasn't been moving around for years. Generally to feed her, to assist her to walk, talk to her, or like... Getting some groceries...

Clearly, study participants have undertaken a variety of caregiving activities, usually on an interim basis, including assistance with mobility and everyday tasks, counseling and emotional support, and information provision. Care was provided to different types of care recipients, including siblings, elderly parents and grandparents, and friends in the same age group. Most caregiving activities were episodic.

5.7.2.3 Published studies on family caregiving and seeking health information on the Web

Several studies have been published in the medical journal literature on caregiving and Internet use. However, none have researched the relationship between caregiving and frequency of Web use for the purpose of finding health information online. However, in Rice’s analyses of Pew Institute studies (2006) on health information seeking online, the
variable, caregiving, operationalized as, “In last 2 years, helped another deal with major illness/health condition”, is significant in one study, both in bivariate and multivariate analysis (Study D, Table 6, p. 21). Widman and Tong (1997) examined all unsolicited electronic mail requests over a one-year period that had been sent to a physician listed on a website that focuses on cardiac arrhythmias. They found that both patients and family caregivers were interested in obtaining information about cardiac conditions, and the majority of information requests concerned treatment.

Two studies on caregiving for cancer patients and three studies on caregiving for the neurologically impaired, respectively, are briefly described here. James, Daniels, Rahman, et al. (2007) examined information seeking by cancer patients and their caregivers. They found a high proportion of caregivers, but relatively few patients, accessed the Internet directly for cancer information. A study (Ginossar, 2008) of the use of two online cancer communities by men and women, both patients and family members, revealed gender differences in participation and differences in utilization between patients and family members. From structured interviews with 84 families of children with epilepsy, researchers found that both family members within the medical profession and lay organizations and Internet sites were highly rated information sources external to the neurology clinic (Lu, Wirrell, and Blackman, 2005). A study conducted at the Baycrest Centre for Geriatric Care (Marziali and Donahue, 2006), on the effects of an innovative, Internet-based psychosocial intervention for family caregivers of older adults with neurodegenerative disease revealed caregivers randomly assigned to the Internet-based intervention showed a decline in stress. Similarly, a study to evaluate the efficacy of a multimedia support program delivered over the Internet to employed family caregivers of persons with dementia demonstrated significant improvements in depression, anxiety, level and frequency of stress, caregiver strain, self-efficacy, and
intention to seek help, as well as perceptions of positive aspects of caregiving. Altogether, these clinical studies suggest a positive relationship between family caregiving and Internet use.

Findings from an analysis of the 2005 Canadian Internet Use Survey (CIUS) on use of the Internet to access health information (Underhill and McKeown, 2008), revealed that although Canadians accessing the Internet to find health information, whom they termed “health users” were predominantly female (55%), married (56%), and had children younger than 18 (42%), the presence of children younger than 18 in the household was not a significant predictor of being a health user. However, one cannot infer from this study that family caregiving is not a predictor of intensity of seeking health information on the Web, as this study did not directly examine family caregiving.

5.7.2.4 Summary of findings on family caregiving and seeking health information on the Web

Study results reveal that the number of type of children (by age group) exhibits a weak, positive relationship to the frequency of use of Web-based CMC. Furthermore, the three-item self-esteem subscale, a measure of the positive aspects of family caregiving in the Caregiver Reaction Assessment instrument, exhibits a weak, positive relationship with the dependent variable, the frequency of seeking health information on the Web, FSHIW (websites). Interview excerpts reveal that caregiving was primarily a positive experience that entailed a variety of caregiving activities for a variety of caregiver dependents. The journal literature supports the role of health seeking online for family caregivers. The analysis of Pew Institute studies on health information online conducted by Rice (2006) revealed caregiving was a significant variable for one of studies examined.
5.7.3 Web self-efficacy

Hypothesis 3: Web self-efficacy is positively correlated with the intensity of health information seeking on the Web.

Web self-efficacy did not affect frequency of seeking health information on the Web.

5.7.3.1 Bivariate relationship between Web self-efficacy and seeking health information on the Web

This statistical finding of lack of a relationship between Web self-efficacy and the dependent variable in this study, FSHIW, is contradicted to a certain extent by the finding that a composite variable, “Strength of Internet Experience” exhibits a weak positive effect on frequency of seeking health information on the Web. This finding is supported by Hargittai’s study of the second-level digital divide (2002), which uncovered a positive relationship between number of years online and level of online skills. However, this post-study variable, which may in some sense be considered an objective measure of Web self-efficacy, does not contribute to the R-squared of path analysis models; the proportion of variability explained by a variable. Consequently, this measure of Web self-efficacy is not considered further as a contributor to the study model.

It is conceivable that the relationship between the dependent variable and Web self-efficacy is insignificant because the measurement of this variable is rather broad. The measure pertains to a learning task - I can use a NEW Web browser to find information on the Web. Because Web browser software, most commonly Internet Explorer, are pre-installed onto desktop and laptop computers, and do not require much of a learning curve for proficient use, participants may over-estimate Web self-efficacy simply because this task seems effortless. All that is required to launch their Web browser is clicking on its desktop icon while the Web user’s Internet Service Provider handles the connectivity to the Internet seamlessly.
The predominance of experienced Internet users in this study, including many university students, also suggests that sampling bias may have rendered this relationship insignificant.

5.7.3.2 Interview Excerpts pertaining to Web Self-Efficacy

Interview data from this study on women using the Web to find online health information indicate participants find the Web easy to use, irrespective of whether they are aware of the functionality of their Web browser and its components; drop-down menu items, control key short cuts, clickable buttons, and other features. From interviews and WebTracker log files, it is evident that only two Web browser actions, clicking the Back button to return to the previously visited website, and utilizing menu options to add a bookmark (Favorites) or to activate a bookmark for navigation to previously visited sites, were used extensively. This indicates that study participants do not make extensive use of Web browser features, irrespective of whether the use Netscape or Internet Explorer.

Although interview participants view Web use as easy to use, frustration with poor search results was evident. Obtaining good search results from mainstream Web search engines was described by some as difficult. This discrepancy between perceived Web self-efficacy and actual proficiency with Web search engines suggests participants may have over-estimated their ability to use the Web effectively. It may also point to the need for measures of Web self-efficacy that are task specific. Very little use of Web browser functionality, in terms of action buttons, such as forward, back, print, stop, and ignorance of their keyboard equivalents, was also mentioned, indicating that these study participants make little use of Web browser functionality, despite their perceptions of high Web self-efficacy.
Part1
[I've become] much more efficient [as a Web user] and realize that at some point I don't need to keep linking [clicking hypertext links] because I'm getting the same information from a different site, which is also probably part of the reason I only go to one or two sites regularly because…

Part2
It's [the Web] faster, easier and just more [emphasis].

I use Back and Forward and Print a lot and Stop [Web browser buttons]. … I don't know the keyboard equivalents.

Part4
….and it's weird, because I think I'm pretty proficient at using my computer and browsing and stuff like that. So I find it kind of strange that I can't get what I want. And I refuse to believe there isn't stuff on, you know, male depression in young men with chronic illnesses, like that's ridiculous. But then I tell myself, well not everything's [emphasis] on the Web. Like, I don't really know, so…

But I also get frustrated with Yahoo because I don't ever feel like I know the correct keywords to find what I want. Like how much more clear can I get? I don't actually know the terms that they want. So, but then also, I'm not familiar with any other search engine, so…

Part5
I would say I am sixty percent not satisfied [with Web search results].

I think the Web… the good thing about Web sites is that it’s easy to use. It’s at home and usually in your room. … The problem is that you don't always find what you want to find. So you will go [online and] spend hours searching but come out with a piece of paper with nothing. But like for those [other information sources]: library, radio, or television stuff you will find something.

I don’t do Forward a lot but I do Back a lot. [Web browser buttons]

5.7.3.3 Published studies on Web Self-Efficacy and seeking health information on the Web

There is an extensive body of literature on the self-efficacy construct: the personal belief in one’s ability to perform a task, which is thought to vary across activities and situations
rather than function as a global disposition measured by a single test (Bandura, 1977, 1982, 1986). However, the journal literature on self-efficacy, as it pertains to use of the Internet, the Web, and various Web services, is modest. Empirical surveys which examine one or more scales of computer, Internet, or Web self-efficacy and other socio-cognitive constructs predominate. Overall, these studies demonstrate the importance of Internet and Web self-efficacy with respect to attitudes and frequency of use of the Internet, Web, or specific Web services (Fenech, 1998; Joo, Bong, and Choi, 2000; Torkzadeh and Van Dyke, 2001, Hsu and Chiu, 2003; Yi and Hwang, 2003; Peng, Tsai and Wu, 2006). However, it must be noted that the study sample in this field of research is overwhelmingly university students who are primarily enrolled in IT studies. In other words, study participants are not representative of the general public.

In contrast to the over-use of student participants in Internet and Web self-efficacy studies, Yoo (Yoo and Robbins, 2008) sampled women from the general public to research middle-aged women’s health information seeking on the Web. Perceived behavioral control (PBC), a variable from the theory of planned behavior, which is conceptually similar to perceived self-efficacy, was examined. There are two questionnaire items for this variable: “For me, it is easy to use health-related Websites.” and “Using health Website I completely up to me.” Respondents scored PBC highly and hypothesis testing using hierarchical regression revealed a positive relationship between PBC and the dependent variable, intent to use health-related websites. However, when another variable, PE (Past Experience with Health-Related Web Use) was added to the regression model, PBC was no longer a significant predictor of BI (intention to use health-related Website). The relationship between past experience and behavioral intention of middle-aged women to use the Web to obtain health information in Yoo’s study is similar to the finding in this study of a relationship
between Strength of Internet Experience and frequency of women seeking health information on the Web. Similarly, Rice (2006), in his analyses of the Pew Institute studies on seeking health information online (2000-2002), found heavy Internet usage was a consistent predictor of using the Internet to search for health information.

5.7.3.4 Summary of findings on Web Self-Efficacy and seeking health information on the Web

This statistical finding of lack of a relationship between subjective measure of Web self-efficacy and the dependent variable in this study, frequency of seeking health information on the Web (FSHIW) is neutralized by the finding of a weak positive relationship between the objective composite variable representing the sum of questionnaire items pertaining to number of years of Internet use, referred to as “Strength of Internet Experience” and FSHIW. This finding is supported by the extensive journal literature on computer/Internet/Web self-efficacy and Internet/Web use. However, this post-study variable does not make a unique contribution to the R-squared of the path analysis models, and therefore, it was not included. Interview transcripts revealed that participants regard the Web as easy to use. However, several participants experienced difficulty obtaining relevant search results when using Web search engines to locate health information online, suggesting that their perception of ease of use of the Web may be inaccurate.

5.7.4 Perceived Information Source Quality

Hypothesis 4: The perceived quality of Web-based information sources is positively correlated with the intensity of their use in health information seeking.

Perception of information source reliability as a measure of information source quality exerts a positive influence on frequency of seeking health information on the Web.
However, perception of information source relevance as a measure of information source quality does not affect frequency of seeking health information on the Web.

### 5.7.4.1 Bivariate relationship between perceived information source quality and seeking health information on the Web

The first of these two study findings on information source quality confirms the importance of information source reliability as a measure of information source quality in studies on the quality of health information websites published in the health sciences journal literature over the past ten years (Chang and Chang, 2009; Weber, Derrico, Yoon, and Sherwill-Navarro, 2009; Matsoukas, Hyun, Currie, et al., 2008; Monturu, Liu, Johnson, 2008; Boyer, Gaudinat, Baujard, and Geissbühler, 2007; Wang and Liu, 2006; Bernstam, Shelton, Waliji, and Meric-Bernstam, 2005; Schloman, 2003; Eysenbach, Powell, Kuss, and Sa, 2002; Buysse and DeMoor, 2002; Pandolfini and Bonati, 2002; Eysenbach, Kohler, Yihune, et al., 2001; Price and Hersh, 1999). Key findings from this body of research are the poor quality of content information on health information websites and the need for information quality assessment tools and seals to improve content quality.

Another key finding in this study on women seeking health information on the Web is the positive influence of perceived information source reliability on perceived information source relevance, and the positive effect of perceived information source reliability on cognitive access (perception of the ease of retrieving and reading health information from the Web). When study participants held the reliability of the Web as a source of health information in high regard, they correspondingly held the relevance of health information on the Web in high esteem, and rated highly their ability to retrieve and understand online health information, and spent more time looking for health information on the Web. All of these positive
findings suggest a level of comfort with obtaining online health information. This cluster of findings concerning information source reliability is consistently observed for all facets of the Web. It suggests that user perceptions of the reliability of online health information act as a filter on their perceptions of ease of use of the Web and relevance of online health information, generating a temporal chain of events controlled by user perceptions of information source reliability.

5.7.4.2 Interview excerpts pertaining to perceived information source reliability of the Web and health information seeking on the Web

Participant 1 demonstrated that user perception of information source reliability is associated with authoritativeness. She displayed a preference for sites authored and maintained by reputable associations and government, and a disinclination to visit personal sites and Web-based CMC due to their perceived lack of validity. The comprehensiveness and currency of health information on consumer health websites were also of concern. Her reliance on a limited number of health websites is supported by empirical studies of Web use (Tauscher and Greenberg, 1997 a, b). As well, revisiting sites is a known Web use behaviour (Cockburn and McKenzie, 2001).

Part1

It's a terrific eating disorder site [Something Fishy]. It's very comprehensive. It's quite similar to, there's another one called Mirror Mirror, which is really the Canadian equivalent to Something Fishy. It's very, very comprehensive. It has just about everything. …. They have all sorts of different aspects of eating disorders, and I will trust their links.

So I went to Something Fishy and then they recommended that site, and if they recommend it then I'll be more likely to go to it because I trust that site. That's really important to me, to know that the site is credible.

And I use them as my sort of jump off points too... If I'm looking for something new, with respect to eating disorders, I'll use that, so almost as my search [engine].
I think I go to a couple of sites that I know, like Health Canada, or… Yeah, probably Health Canada is the biggest one. They have a really good sort of site for, not for professionals, but for personal health information, and [I] link from there.

I have the same [Web use pattern] for other health issues too. I would… The Canadian Government has a site, I forget what it’s called, off the top of my head, but it’s in my Bookmarks [Canadian Health Network]. That [site] has a lot of information and links, and I’ll trust that because it comes from the government. I’ll go to the Mayo Clinic site in the U.S., and I’ll pick one or two sites that I trust because you can post anything on the Web.

And I very quickly learned… I tend not to look at peoples’ personal sites. I didn’t find it helpful for me. I don’t put as much validity on them.

I trust web sites more than e-groups, listservs… [It] depends whether or not they’re moderated too. Like listservs, that would be a big…

Anytime more people are allowed to put in their own opinions, I'm leery of the information. If I'm looking for people to talk about experiences, then e-groups and such are better, but I'm also reading it as this is an experiential thing. If I'm looking for information about medication, I want to know that it's credible.

I tend to pick, [I] have a couple of sites that I really like, and I do this for everything, I don’t just do this for health information.

Comprehensive, accessible, and particularly for health information, [and] right up-to-date. I will look at last updated in web sites, particularly health ones. If I find they haven't been updated for two years, I move on.

Participant 2 noted the importance of presenting research findings on new treatments. For her, authoritativeness is an important attribute of reliability.

Part2

And I really like them because they are more professional and they do have current research as opposed to proven [emphasis] research. So I like to see where the thinking is going so I can sort of figure out on my own and be up to date because I sort of want treatment. …. because I've basically tried everything that's out there, so I want to know whatever is new, just keep up to that so I can try it right away.

If I see that, that's a website directed to doctors, it's going to be more reputable than if it's just directed to the public at large. …WebMD, because they're dealing with such a large public, they have to be accurate, sort of. So I was going to narrow it down like that.
Participant 3 places health information seeking on the Web in the context of obtaining health information from the other information sources she relies on, namely, healthcare practitioners and her mother, an indication that she ranks health information on the basis of the authoritativeness of the information source from which it was obtained, and triangulates information obtained from several sources. She also notes that commercial elements on the Web adversely affect reliability.

**Part3**

Even if I like something that looks really official and whatever, like, I’d rather hear it from a doctor who I know is a doctor, than a website. I sort of use it to supplement information, but I would never use it... I would put it like...my lowest part of...in my hierarchy of...getting [information]... Like there’s doctors, there’s my mom, and there’s the web.

It [Google] just finds everything I’m looking for. Yahoo, I find, is too commercial, there is too much advertising on it. Google just gives you what you need.

Excerpts from interviews with Participants 4 and 5 confirm that authoritativeness and currency are important attributes of information source reliability and commercial elements on the Web are not regarded as credible.

**Part4**

The thing that I don’t like about the Internet compared to other stuff, is I think the Internet gets outdated quickly.

**Part5**

I guess it’s about authority. Like who is hosting the site and what is the site for? If this site is hosted by the doctor or by [a] clinic, maybe, like, the information will be more, how do you put that... more... [More] reliable than those ones provided by a commercial company.
Overall, the attributes of reliability identified from interviews with this subgroup of study participants are: comprehensiveness (scope, depth, range of topics covered); authoritativeness (the expertise of the authors of the content); currency (frequency of updating online health information) which was perceived as highly variable and difficult to ascertain, and trustworthiness. Other attributes mentioned are: accuracy, inclusion of research findings, absence of bias, and lack of advertising. These attributes of reliability, also commonly referred to as credibility in the journal literature, are in agreement with those identified by Eysenbach and Köhler (2002), Hong (2006) and Rieh's research on credibility assessment and cognitive authority (Rieh (Hilligoss and Rieh, 2008; Rieh, 2007; Rieh and Danielson, 2007; Rieh, 2002).

These interview participants tend to regard large portal health sites and websites authored by clinicians or government health departments to be more reliable than health websites authored by individuals, including those writing about their personal health experiences. This finding also held true for health portal sites versus CMC channels. Revisiting trusted sites is a commonly employed tactic. The hypertext links on trusted sites are utilized to locate other reliable sites on the same health topic.

They did not rely solely on the Web as a source of health information but triangulated or cross-checked the information found on one health websites with information from other websites, and information obtained from other information sources, including clinicians, family members, and print sources. Although quality was a concern for all participants, they did not utilize health sciences journals and textbooks to meet their health information needs, despite having ready access to these high quality, domain-specific, information sources.
Online health information seeking increases during times when severe emotional distress associated with existing mental health conditions is experienced. Finding health information of topical relevance, such as basic information about depression, is insufficient. Participants sought health information content on health websites and Web-based CMC channels that directly matched their specific information need. The content must also address the emotional dimensions of the illness experience and provide social support through communication and information sharing with others who have the same mental health condition. Participants need highly tailored information that is relevant to their immediate situation and its affective dimensions. Those who are family caregivers or who have friends with health conditions also search for health information directly pertaining to these health conditions and again, the match between not only topical but situational and affective relevance is considered highly important and valuable.

Interviews with mental health participants highlight the importance of relevance, more specifically, situational relevance. These participants expect to find online health information that directly matches the current state of their personal health condition(s) and at the same time addresses the emotional or coping dimension. The broader context of cost and availability of treatment options within the framework of the national healthcare system is another aspect of situational relevance. As well, while information source reliability was viewed with ambivalence for individual-authored health websites and CMC channels that focus on the experience of having a mental health condition, participants felt that these Web information sources may contain information of higher situational and affective relevance, two dimensions of the relevance typology that are conceptualized here as subtypes of topical relevance. This focus on situational relevance,
matching the content on health websites to the specific aspects of mental health conditions and the illness experience, is strongly congruent with Dervin’s sense-making framework (1992), which examines information seeking behaviour without studying the attributes of information sources and information retrieval systems. Excerpts from interviews with mental health participants highlight this finding.

For Participant 1, eating Christmas dinner with family members is a stressful event because of the likelihood that family members will treat her differently due to her anorexia. The Web articles she retrieved are highly relevant to her situation because they offer information on coping with holidays that is tailored to individuals with eating disorders.

**Part1**

….and because it was going to be Christmas and the holidays, I was looking for some of the sites [that] have, “For individuals with eating disorders Tips for getting through the Holidays” and I went looking for those. So I probably used NEDIC [site] as a launching point.

I do remember that that site that I went to, on change, it had a very good article about… for people with eating disorders dealing with the holidays, and I think that I printed it up and I took it with me and I read it every day over the time that I was at my parents' house, and I think I just used it as a sort of re-affirming, to sort of balance all the stress going on in the house. Nothing particularly grave in terms of stress, simply holidays. You know, four days intense being with the same four people… … it's stressful because it's food, it's stressful because it's family, it's stressful because it's change in routine, that sort of thing.

And so I went looking for an eating disorders people in recovery support group, and it was very hard to find because I went looking under eating disorders. I found all sorts of support groups to help keep you ill, like, “I don't want to get better; we can all share our trade secrets.” [pro-anorexia sites] I didn't want that. I had a hard time finding the support ones, but once I did I was very happy with them.

If anytime I'm looking for availability of treatment, I only am interested in Canadian ones. Prices. The whole issue of access to health care, what's available, how it's affected, that's a bigger deal in the US than it is here, and so some studies and some things I've looked at I read it and I think, “OK, but in Canada it wouldn't look the same, so it isn't helpful.”
Participant 2 is primarily interested in information about new medications for depression. In particular, she is interested in learning about the experiences others with depression have had with new medications, including side effects, because this kind of information directly pertains to her situation as an individual with chronic depression. As well, she derives comfort from reading about the experiences of others with depression posted in online chatrooms, which help her to feel less alone and suicidal. Web CMC is better able to meet her emotional needs than health websites.

Part 2

I use the Web a lot to search for medications. I've been on the same medications for a while now, so you didn't really show that [in the WebTracker log files], except for the Remeron. But almost every medication, new medication I'm on, I'll search for information on the Web. And that's where the Web is better than any library because it will give you, at once, information from different countries, sort of, and various...

And also, [there is] just more information on the drug itself. My doctor will tell me a few side effects, but he won't mention something that I might notice myself, or .... Where do we go from here and also, just more information on what they already told me.

Well, the suicide one [posting on a message board] is relevant [to me] just because, like, I have a severe mood disorder and because it's... no medication has been effective, it's sort of not being treated. And there's been times when I've been suicidal, and also, it's just severe mood disorders are an interest of mine, so...

... I would love to join it (chatrooms), and, like, a number of groups, but what I identify with about the people who are talking is the more severe depressive episodes.

Well, nothing changed me [about using the Web to find health information] except it might have prevented me [from attempting suicide], sort of. Like when I'm really depressed, I can be suicidal at times, which is usually when I'd look at the chatrooms. And if I feel, you know, understood on that board, that I'm not alone, and I'll usually feel less suicidal. So it will sort of prevent me from getting to a point, where I would ever do that. So, I think that's the only way.
Not so much consolation, just affirmation and half identification. [It's] just a reminder that I'm not alone.

But it was just nice to have, sort of, the validation that others have gone through this, or I liked reading the chat messages. Because you saw that even when someone was exhibiting more depression symptoms, sort of, that other people on the board try to support her, which I thought was really helpful and they had interesting suggestions and stuff.

Participant 3 describes the relevance of health information websites as variable in the context of her searches on body mass index (BMI), specifically BMI calculators. These online calculators are generally intended for overweight individuals as a tool to guide weight loss, and thus are not relevant to her situation as an individual who is underweight.

Part3
I found out my [BMI] number on the other site and so I wanted to know what that meant. And I looked around in here, but I guess… I can’t remember exactly, but I obviously didn’t find what I was looking for. … If you click on “more on body mass index,” I guarantee I probably went there. And yeah – the blurb they had about it, like just to the left, I didn’t really find sufficient, especially for what I was looking for.
… mine [weight] is too low, and that one is really like geared if you’re overweight. Usually people look at that if they’re overweight, so I didn't really think it applied to me.

5.7.5.4 Published studies on perceived information source quality and seeking health information on the Web
Eysenbach and colleagues (Eysenbach, Powell, Kuss, and Sa, 2002) conducted a comprehensive systematic review of empirical studies on the quality of health information websites. They identified 79 studies published in 2001 or earlier which altogether had evaluated 5941 health information websites and 1329 web pages. Quality assessment criteria frequently examined in these studies are: accuracy, completeness, readability, design, disclosures, and references provided. More than two-thirds
of studies reported poor quality of health information on the Web. The authors noted the large number of descriptive studies and comparatively smaller number of analytic studies and called for more analytic research in this field.

In another study, Eysenbach and Köhler (2001) utilized a unique multi-method observational design to research the health information seeking behaviour of 21 men and women recruited from the general public. Data collection included focus groups, naturalistic observation of study participants as they searched the Web on health questions provided by the researchers, and post-search in-depth interviews on their search behaviour. Study participants identified several criteria for reliability judgment, including: authoritativeness of sources (ability to identify the authors of the content); language (readability); scientific appearance, professional design, and ease of use. Information from the official websites of public institutions, organizations, and associations is considered trustworthy. Advertising, such as banner ads, adversely affected perception of credibility. The unique contribution of their study is the user identification of dimensions of reliability. Two limitations are the artificial nature of the search tasks which were predetermined by the researchers and the restricted timeframe for completion of these search tasks.

Many studies have been published on the quality of mental health websites and the finding of poor quality information on mental health websites is frequently reported (Ferreira-Lay and Miller, 2008; Morel, Chatton, Cochand, Zullino, and Khazaal, 2008; Khazaal, Fernandez, Cochand, Reboh, and Zullino, 2008; Nemoto, Tachikawa, et al., 2007, Seyringer, Schrank, et al., 2007; Ipser, Dewing, and Stein, 2007; Culjak, Nicholls, Leveaux, and Kowalenko, 2007; Powell and Clarke, 2006; Griffiths, Tang, Hawking, and Christensen, 2005; Griffiths and Christensen, 2002; Lissman and Boehnlein, 2001; Dearness and Tomlin, 2001; Tomlin, Dearness, et al., 2001; Darmoni, Haugh, Lukacs, and Boissel, 2001; Griffiths and Christensen, 2000).
The finding of a positive relationship between information source reliability and frequency of seeking health information on the Web is supported by research studies that focus on the reliability of health information on the Web, although these studies did not empirically test the relationship between these two variables, with a few exceptions. Specifically, Rice (2006) found that information source reliability, operationalized as, “How much of the health information you see on the Internet do you think you can believe?”, was a significant variable in bivariate and multivariate analyses of one Pew Institute study on seeking health information online (Study G, Table 6, p. 22). Leung (2008) found that reliability, as one measure of expected value/quality of health information websites, was a significant variable in a hierarchical regression with Internet embeddedness as the dependent variable, and this set of variables, as a whole, displayed a significant correlation with Internet usage intensity (p. 567).

However, the finding of a positive relationship between information source reliability and frequency of seeking health information on the Web is not supported by methodologically similar survey research studies on information source selection and use (Choo, 1993; Choo and Auster, 1993, 1994; Marton and Choo, 2002; Woudstra, 2005; Woudstra and van den Hoof, 2008). These empirical studies reported minimal or non-significance of the relationship between information source reliability and frequency of information source use observed, and generally stress the importance of relevance as a construct of information source quality. The difference in relative importance between these two measures of information source quality on the dependent variable, FSHIW, can be attributed to the differences in study samples. In this study on women seeking health information on the Web, women from the general public were recruited. In contrast, in the studies cited above, information professionals were studied. Information professionals are experts in evaluating the reliability of information sources whereas
the public does not possess this skill to any measurable extent. Information professionals may place more emphasis on information source relevance as a measure of information source quality because they already have ready access to high quality information sources, in addition to being experts on evaluating the reliability of information sources.

In a comparable study of women seeking health information on the Web conducted by Yoo (Yoo and Robbins, 2008) information source quality per se was not examined, but items measuring perception of information source reliability were embedded in four out of five independent variables examined: attitude (Reliable-Unreliable), Gratifications Sought (To obtain good quality of health information), Behavioural beliefs X Outcome evaluation (Allowing me to obtain good quality health information), and Control beliefs x Perceived power (I am able to evaluate the quality of information on health-related Websites). Because items pertaining to information source quality were embedded in other variables, the relationship between the dependent variable (behavioral intent) and information source quality cannot be independently examined.

Two recent empirical studies from the field of health communication have examined Web user perceptions of the relevance and reliability of the Web as a source of health information. Hong (2006) confirmed the importance of information source reliability as a factor influencing Web use while Leung (2008) confirmed the importance of information source relevance to Web use. Findings from these studies are described in detail.

Hong (2006) conducted an empirical study of the relationship of relevance, knowledge, and media reliance on website credibility, a variable that is synonymous with reliability. Five dimensions of website credibility were examined: trustworthiness, expertise, depth,
fairness, and goodwill. The dependent variable is intention to revisit a health website. Two health information search tasks were randomly assigned to study participants; a general task and a specific task. Both pertained to tobacco cessation. Eighty students completed the study, in which assignment to one of two search tasks was randomized. Path analysis revealed that media reliance and knowledge, but not relevance, are significant predictors of Web credibility for the general search task, while media reliance alone is a significant predictor of credibility for the specific search task, for three attributes of credibility: trust/expertise, depth, and goodwill. In turn, only trust/expertise and depth were found to be predictive of intention to revisit a health website. Effect sizes were modest for both path analysis models.

Several limitations of this study must be noted, first and foremost, sampling issues may be present because the sample size is small relative to the number of variables studied and the sample is comprised solely of students. Second, poor operationalization of the relevance variable is evident. Relevance was assessed by one dichotomous questionnaire item that asked participants whether they currently or previously had smoked (yes, no). Third, the search tasks were determined by the researcher and were not reflective of study participants’ health status and health information needs.

Overall, findings from this study support the importance of information source reliability on health information seeking on the Web and the attributes of credibility that influence the dependent variable of the study are similar to those noted in the interviews with mental health participants in this study, namely, trustworthiness, expertise, and depth. The latter two can be considered synonymous with authoritativeness and comprehensiveness, respectively.
Leung (2008) investigated the types of health information sought by Web users and examined the relationships between four groups of factors: health information seeking (medical treatment, hard to talk about health issues, family health, health improvement); expected value/quality of health information websites (reliability, relevance/context, interaction); demographics (age, gender, household monthly income, education), and Internet usage intensity (Web search, online news, e-mail, instant messaging, blogs, forums) and the dependent variable, Internet embeddedness, which was defined as the role the Internet plays in making important decisions in life. The variables examined in Leung’s study are comparable to those researched in this study of women seeking health information on the Web, although there are differences in the operationalization of the study variables, and the use of Internet embeddedness as the dependent variable instead of intensity of health information seeking on the Web, which is included as one of four sets of independent variables.

Hierarchical regression was conducted on a sample of 569 Internet users from a telephone survey conducted in Hong Kong in August 2006. Survey results reveal significant but weak correlations between three of four attributes of health information seeking, which is comparable to health information needs, and the dependent variable, Internet embeddedness. As well, significant correlations with robust effect sizes were observed between all three attributes of expected value/quality of health information websites (reliability, relevance/context, interaction), and Internet embeddedness, and between Internet usage intensity (Web search only) and Internet embeddedness. Demographic variables were not found to be significant predictors of Internet embeddedness. Leung’s study supports the role of health information needs, and information source relevance and reliability, as significant predictors of Web use.
Concerns about the reliability of online health information sources justifiably dominate in the domain of consumer health, which concerns itself with the use of health information by the public. Poor quality health information has the potential to cause serious harm, and even death, if relied on exclusively. User perceptions of information source reliability seem capable, in turn, of influencing perceptions of information source relevance and perceptions of the readability and understandability of information on consumer health websites.

There are many issues associated with relevance judgment, as described by Saracevic (2007c) that can explain why information source relevance did not influence frequency of health information seeking on the Web in this study. First, the dynamic nature of relevance makes measurement difficult. Relevance judgments change over time as a function of changing tasks and learning (Schamber, Eisenberg, Nilan, 1990). Moreover, humans are inconsistent in judging attributes of information in general. Inconsistency in relevance judgments is more evident when relevance judgments are made by raters lacking in subject expertise (Saracevic, 2008).

Perceptions of information source quality from the interview data of five participants with mental health conditions provide insight into the actual process by which these women evaluated the relevance and reliability of health websites as they visited them during sessions of seeking health information on the Web that were captured within timeframe of this study using WebTracker, history files, and journal entries.

Concerns expressed by study participants with the reliability of health information on the Web are supported by a 2007 study conducted by the Canadian Internet Project (CIP). Zamaria and Fletcher (2007) found that experienced, heavy Internet users who possess more education are most likely to visit information-related sites, and health information
seeking online is a frequently undertaken activity. Canadians are more cautious about the reliability of online information than people from other countries. However, those Canadians who are experienced and heavy Internet users are more confident about the reliability of online information, as well as online security, suggesting that Internet experience mediates perceptions of the Internet as a reliable information source and secure technology.

5.7.4.5 Summary of findings on perceived information source quality and seeking health information on the Web

Perceived information source reliability as a measure of information source quality, but not perceived information source relevance, is positively related to frequency of seeking health information on the Web, FSHIW, contrary to a methodologically similar study on women in IT professions seeking information about IT on the Web. Situational relevance and affective relevance were identified from interviews with a subgroup of study participants with chronic mental health conditions as critical to quality assessment of online health information. Furthermore, a survey study on health information seeking on the Web conducted by Leung (2008) found a significant relationship between relevance and frequency of seeking health information on the Web. Several studies on health information seeking on the Web have identified information source reliability as a predictor for this behaviour (Yoo, 2003; Rice, 2006; Hong, 2006; Leung, 2008).

Attributes of information source reliability identified by a subgroup of study participants with chronic mental health conditions are as follows: comprehensiveness, authoritativeness, currency, trustworthiness, accuracy, inclusion of research findings, absence of bias, and lack of advertising. These attributes of information source reliability are strongly supported by published research from both the field of library and information science and the health sciences.
5.7.5 Perceived Information Source Accessibility

Hypothesis 5: The perceived accessibility of Web-based information sources is positively correlated with the intensity of their use in health information seeking.

The relationship between perceived information source accessibility and the dependent variable, frequency of seeking health information on the Web, FSHIW, was not supported.

5.7.5.1 Bivariate relationship between perceived information source accessibility of the Web and health information seeking on the Web

The postulated relationship between perception of physical access to the Web as an information source and the dependent variable, frequency of health information seeking on the Web, was not observed. Similarly, the postulated relationship between perception of cognitive access and frequency of health information seeking on the Web was not observed.

5.7.5.2 Interview excerpts pertaining to perceived information source accessibility

Interviews with study participants who have chronic mental health conditions revealed that these participants regard their current Internet access (physical access) as fast and reliable, irrespective of whether they have dial-up or cable Internet connectivity. Similarly, they experience obtaining health information from the Internet and Web use (cognitive access), as effortless. However, at times, barriers to connecting to the Internet were experienced. Also, several barriers to accessing information on the Web were identified: pop-ups, poor navigation, unhelpful images and diagrams, and other media files. Retrieving relevant results from Web search engines was also a problem for several study participants on occasion. Excerpts illustrate participants’ encounters with these barriers during their Web use sessions.
Part 1

I found that I got the information (searching the Web for information about anorexia) myself pretty quickly.

I usually go looking for a specific piece of information, so I like to be able to find it as quickly as possible. So I find links very frustrating because if I don't find it, I link forward, and then I have to link all the way back and pick a new route, and I often can't tell how....

I like a good side bar that I could still see the main one and have a window on the side. I find that more useful than having the same piece of information on each page at the top, because then I stop having to go up and down the page. I like ones that have really... If it's a really long page, that I can, at the top, click on one word and it will take me down there immediately.

I don't like really fancy graphics that take forever to load. .... I found stuff like that [multimedia elements] tedious because it slows down. I mean I can read, I'm articulate, that's the easiest way for you to get the information [from text].

Part 2

The only thing I don't like about my dad's computer is that the security often blocks access to things, so, like it will block me downloading "Cubans for Medications". ..... The company [that employs her father] set them up [blocks on Web CMC subscription]. And also, yes, I can't get into the chat groups and I can't, yeah, I just can't respond and really connect.

If it takes me a long time to load I'm annoyed, but I don't like when sites have a title page, which you then have to click into to get to the actual information.

Part 3

Well the way I rated these [web sites], I’d rate them after I saw them, so comparatively I don't think it did – [be]cause if you scroll down, the diagrams are kind of icky.

If there’s pop-ups, that bothers me, a lot.

And I like it to just be easily organized and easy to read and lacking, like, technical jargon and stuff like that.
That's really [emphasis] annoying [search results on health topics retrieve porn]. That doesn't happen to me too often because I use pretty safe keyword searches, but even so.

I hate dead links. I think that's so annoying, especially when they show up on Yahoo. They should just clean that up.

I don't like it when people have… this doesn't happen to me when I was looking, but I don't like websites where you go somewhere and something else pops up.

And I don't like when you go to websites and there's music, that's annoying. [laughing] ….. And it's like it'll never stop when you hit stop [button], it's those stupid little MIDI [sound] files, they sound so awful and I just don't like that personally. [laughing]

5.7.5.3 Published studies on Perceived Information Source Reliability of the Web and health information seeking on the Web

The lack of significant relationships between perceived information source accessibility variables and the dependent variable, frequency of seeking information on the Web, is supported by similar survey studies in information science research conducted by Choo (1993), Auster and Choo (1993; 1994), Marton and Choo (2002) and Woudstra (2005; Woudstra and van den Hoof, 2008).

It is not surprising that users' perceptions of physical access to the Web did not affect frequency of seeking health information on the Web, given the characteristics of the survey sample. The majority of survey respondents are young women who are connected to the Internet by at least one Internet Service Provider, and who have been using the Internet for several years. The survey respondents are by and large experienced Internet users, despite lacking an academic background or work experience in the IT sector, who have access to the Web from multiple locations: home, work, school, and the library.
This profile of study participants as savvy Internet users based on survey data collected in 2000-2001 is validated by recent studies of Canadian Internet demographics and usage patterns conducted by academic research institutions, government statistical data, and polling data from market research firms alike. The Canadian Internet Project (CIP) is a national academic, government, and industry consortium that conducts large sample longitudinal studies of trends in Canadians’ use of the Internet as well as traditional media and emerging technologies. It is a member of the World Internet Project, which publishes an annual report that compares data from its member countries.

The second CIP report (Zamaria and Fletcher, 2007) revealed several interesting findings concerning Internet access and use in Canada. First, Canada has one of the highest rates of Internet use and broadband access to the Internet. Nearly 90% of Canadians over the age of 12 have been online, while nearly 80% are current users. Most Canadians who are online are heavy Internet users, spending approximately 17 hours a week online, a noticeable increase from the year of CIP’s first study in 2004. Also consistent with this study of women seeking health information on the Web, the CIP study found that Canadians predominantly access the Internet from home (94%) using a wired PC (90%).

Zamaria and Fletcher (2007) found that experienced, heavy Internet users who possess more education are most likely to visit information-related sites, and health information seeking online is a frequently undertaken activity. Search engines are popular, in particular, Google, Yahoo, and MSN. While the foremost reason for going online is to seek information, entertainment and social interaction have become popular online activities. E-mail remains the most frequently used Internet application (79%). Participation in chatrooms was less popular (17%) than instant messaging (57%).

More Canadians have access to the Internet through high-speed connectivity – cable (37%)
and ADSL telephone (36%). Broadband access noticeably changes Internet usage patterns. Those with broadband access spend double as much time online and access bandwidth-intensive media, such as music, television, movies, videos and games, through their high-speed Internet connection. However, Internet use does not replace traditional media consumption but supplements it.

Most importantly, the authors of the 2007 CIP report noted that the digital divide is narrowing for marginalized social groups. While youth, young adults, and students are the early adopters of emerging technologies and new online applications, indicating that age is still an important factor influencing Internet adoption, slightly more than 50% of the elderly are online. Although those with greater income, education, and professional status are more likely to be online, these gaps are declining. The urban-rural digital divide and the language digital divide between Anglophones and Francophones have decreased. The gender gap has almost vanished. However, males utilize more applications and undertake more activities online than females. This finding of gendered Internet use is supported by research conducted earlier in this decade (Veenhof, 2006; Bimber, 2000). Statistics Canada data from 2005 (Veenhof, 2006) concerning heavy Internet users indicated that heavy users tended to be younger than moderate users and non-users. As well, heavy users were more likely to be students or unemployed individuals, and much more likely to be male.

While 22% of Canadians are non-users, they are non-users by choice, not because of lack of affordability. Lack of interest was cited as the most the common reason for not using the Internet. Non-users are more likely to be older and retired, female, concentrated in Central Canada, and living in smaller communities. Those who have ceased to use the Internet or are avowed non-users are the least comfortable with
technology, relying on conventional print and mass media technologies, which would seem to argue for the importance of self-efficacy as a determinant of Internet adoption and use. One noticeable shortcoming of this large-scale telephone survey is the lack of data on Canadian Internet users by race. However, a recent Internet study conducted in the United States by the Pew Research Center (Fox, 2009) suggests the racial digital divide may be disappearing due to the advent of mobile devices.

Findings from the 2008 Canadian Inter@ctive Reid Report by IPSOS Reid largely corroborate findings from the 2007 CIP report detailed above. Many Canadians (85%) access the Internet from multiple locations, including home, work, smartphone/PDA, etc., and high-speed access has increased. These findings suggest that physical access to the Internet and Web is no longer an issue. The most frequent online activity is e-mail (94%). Posting at online forums (26%), doing research for school projects/homework (39%), downloading music (44%), online gaming with friends or strangers (62%), reading blogs (36%) uploading photos to a website (45%) are popular online activities, attesting to the increasing use of the Internet for entertainment. Canadian Internet users are very satisfied with their search results from the three major Web search engines: Google, Yahoo, and Microsoft Live Search (formerly MSN, now Bing), with 75% claiming they can usually find what they are looking for on the first page of search results.

According to the 2007 Canadian Internet Use Survey (Statistics Canada, 2008), Canadians increased their overall use of the Internet and are utilizing the Internet for an increasingly more diverse range of activities. Canadians overwhelmingly access the Internet from home (94%) and high-speed connectivity is becoming more widespread. Of the Canadians who access the Internet from home, two-thirds go online daily and 50% are online for five or more hours a week. The most popular online activities are e-mail
and Web browsing. The Web is used extensively to find information, including health information. Contributing content by writing blogs, posting images, and participating in discussion groups are also popular activities, more so for young Internet users. Accessing music, television, movies online has increased with greater broadband access to the Internet.

Supporting the findings from the 2007 CIP report, the Statistics Canada data on Canadian Internet users indicates the existence of the digital divide, according to gender, income, age, and population density, but one that is declining in size in recent years. Men go online more often than women and for longer periods of time. Canadians in the highest income quintile (over $95,000) are twice as numerous online than those in the lowest quintile (less than $24,000). However, this gap is smaller than found in 2005. As well, Canadians with post-secondary education are Internet users more so than those with less education. Again, this gap has declined somewhat since 2005. Younger Canadians are predominantly online (96%). Only 29% of seniors are online users according to this survey. However, the age gap has declined since 2005. Interestingly, those born in Canada and recent immigrants to Canada have comparable Internet usage: 75% versus 78%.

Regional disparities evident in the 2005 survey (Statistics Canada, 2006) are apparent in 2007. While rates of Internet use increased in every province, Ontario, Alberta, and British Columbia have rates of Internet use that are greater than the national average. Urban-rural differences are evident. More than 50% of rural and small-town Canadians do not have access to high-speed Internet. Small towns and rural areas have significantly fewer Internet users than urban areas. However, these differences may also be attributable to the greater number of young, educated, and well-to-do inhabitants residing in urban areas.
Yoo (2004; Yoo and Robbins, 2008) in her dissertation study of middle-aged women’s health information seeking on the Web did not examine perception of physical access to the Web directly. However, several Likert-scaled items in one study variable, the Control beliefs x perceived power variable, are similar to those employed in this study, namely, “Cost of the Internet connection affects my using health-related Websites”; Lack of access to the Internet at home affects my using health-related Websites”; Speed of the Internet connection affects my using health-related Websites”; “Membership obligation on some health-related Websites affects my using health-related Websites”. The effects of these belief-based measures on the dependent variable, behavioral intention to use health websites, were inconsistent, leading the authors to suggest revisiting the inclusion of these variables in the model.

It is well documented in journal articles and books published in this decade that examine the intersection of gender and computing/IT (Bimber, 2000; Dryburgh, 2000; Margolis and Fisher, 2003; Fox, Johnson, and Rosser, 2006; Cooper, 2006; Pau, Hall, and White, 2007; Burger, Creamer, and Meszaros, 2007; Anderson, 2009), that girls and women, despite their aptitude and interest in computing/IT, frequently experience inequalities in access to computer technology, and discrimination in computing/IT education and employment. They may also to some extent experience lack of recognition for their accomplishments in the IT sector, or even harassment from male IT co-workers and managers.

The gender gap does not prevent girls and women from using the Web to conduct searches on health topics. This may be the case because Web use is a comparatively simple computing task that does not require any knowledge of computer programming or network administration, only basic computer skills such as the use of a computer
keyboard, mouse, and Web browser. Moreover, it is an activity that is conducted primarily in the privacy of one’s home for personal fulfillment, and therefore is not as much at risk for disruption by others. However, it is interesting to note that one of the participants (Part4, p. 224) identified online porn as a barrier to access: retrieving porn when searching the Web on a women's health topic was perceived as an unpleasant experience. Is this an instance of user perception of information source reliability affecting cognitive access, a bivariate relationship observed from path analysis in this study? If the Web user terminated the search session at this point, it may to some extent indicate that unpleasant or unwelcome content adversely affects information retrieval and readability.

What is unique about this study on women seeking health information on the Web is the discovery of a positive, statistically significant relationship between perception of cognitive access to health information content on the Web and perception of physical access to the Web. Specifically, survey respondents’ perceptions of their ability to retrieve and to read and understand health information on the Web influenced their perception of their physical access to the Web. This was particularly true when the Web is conceptualized as text-based content. From the interviews, it is evident that users experience difficulty reading and understanding online information from poorly designed websites. Study participants noted that design elements that were unrelated to the information or that caused delayed connection times or distraction, such as multimedia elements and pop-ups, affected their comprehension of the information, as well as diminishing their perception of its reliability. A human-computer-interface (HCI) element for perception of the Web in terms of cognitive access is suggested; the presence of non-essential elements such as graphics or sound may add to cognitive load, thereby slowing down comprehension of online health information.
5.7.5.4 Summary of findings on perceived information source accessibility of the Web and health information seeking on the Web

In summary, no relationship was observed between perceived information sources accessibility (physical access, cognitive access) and the dependent variable, frequency of health information seeking on the Web, FSHIW. This negative finding is consistent with several studies on information source characteristics and FSHIW cited on page 270. Despite several experiences with barriers to accessing and effectively using the Web, interviews with study participants who have chronic mental health conditions revealed that perceptions of access to the Web as a source of health information are positive. The perception of ease of access to the Web is attributable at least in part to widespread access to the Internet in Canada and widespread use of the Web by Canadians.

5.7.6 Demographic Variables

Although hypotheses postulating relationships between demographic variables and the dependent variable do not formally contribute to the theoretical framework, these types of variables are commonly included in survey studies, as they have been consistently shown to have significant relationships with variables under study, in particular, gender, race, income, geographic location, age, and education. It is well known from both national polling studies of Internet use trends conducted by governments and polling firms, and academic research on Internet access policies, that Internet connectivity and computer literacy is unevenly distributed across society. This digital divide has been extensively examined by researchers in relation to income, race, and gender, as described in the Introduction Chapter. Clearly, individuals with low income, or socioeconomic status, have less access to high speed, private, home-based Internet access and generally have less education.
This study on women seeking health information on the Web is characterized by a sample of women who are predominantly young, middle-class, Caucasian, and well-educated. These sample biases for education and race are found in other comparable survey studies of women seeking health information on the Web, including Warner and Procaccino’s 2002 mail survey study on the characteristics of female Web users seeking health information online (2004; 2007) and Yoo’s dissertation mail survey (Yoo, 2004; Yoo and Robbins, 2008) on factors influencing middle-aged women’s intent to seek health information on the Web. Survey respondents have access to the Internet, both at home and at school, and possess sufficient computer skills to navigate the Web for health information. Despite these demographic characteristics, differences in Web use were identified according to racial identity, income, and occupation, with the largest effect size observed for racial identity.

5.7.6.1 Racial and ethnoracial identity

Racial identity was narrowly defined in the Web survey questionnaire as racial identity, and captured the major racial groups – Caucasian (European), Caucasian (Hispanic), Caucasian (Middle East), Asian, South Asian, Black (Caribbean), Black (African), Aboriginal (N. America), Aboriginal (C./S. America), and Aboriginal (Australia).

Racial identity influences the frequency of using the Web to find health information on the Web.

5.7.6.1.1 Bivariate relationship between racial identity and seeking health information on the Web
Caucasians accessed Web-based content more frequently than non-Caucasians. Racial identity also influences perceptions of the reliability of the Web as a source of health information for Web communication channels. Non-Caucasians (Asians, South Asians, and Blacks) had a more positive perception of the reliability of health information obtained from Web communication sources than Caucasians, which may indicate a preference for health information from online communities, or social information. These statistical findings must be tempered by the fact that only 93 of 264 study participants completed the racial identity question on the Web survey, and the overwhelming majority of those that did were Caucasian.

5.7.6.1.2 Interview excerpts pertaining to ethnoracial identity and health information seeking on the Web

For qualitative researchers, ethnoracial identity is a broader concept than racial identity, as previously discussed in Section 3.5.2 Study Population Characteristics on page 97. It encompasses several overlapping dimensions: nationality, race, ethnicity, culture, religion, and language. In general, this rather broad and unwieldy social sciences construct serves to distinguish groups of individuals according to how they identity themselves within society-at-large. This process of identification is bi-directional: individuals can choose to self-identify with a specific ethno-racial group and practice the customs and beliefs of that group, or it can be imposed upon the individual by society through its major institutions – government, academia, news media etc., which classify individuals based on their observed adherence to the country of origin, first language, and social, cultural, and religious norms and practices. Ethnoracial identity has been found to influence personal and group health practices, in terms of preference for a specific health tradition (e.g. Chinese, Indian, shamanistic, and others), over or in addition to use of Western medicine, which is perceived as driven by scientific research and technological advances.
Qualitative interview data from this study of women seeking health information on the Web affirm the importance of ethno-racial identity in relation to personal health practices, in terms of adherence to traditional medicine instead of, or in addition to, Western medicine. Participant 1, a Canadian citizen with German ethnicity, notes that when she sought treatment for anorexia in Germany, practitioners offered a more holistic perspective of healthcare. Similarly, Participant 2, also a Canadian citizen with European ethnicity refers to her upbringing as less reliant on Western medicine, and Participant 4, a university visa student from Taiwan emphasizes her reliance on Traditional Chinese Medicine and undertaking exercise that is culturally influenced, namely the Korean martial arts, Tae Kwon Do, for the purpose of weight loss. What is also readily apparent is the role, found in many cultures, European and Asian alike, of the mother as expert on health practices and family caregiver to all family members – spouse, children, and aging parents. Relevant excerpts from the subgroup of study participants with mental health conditions are presented below.

Part1
Well, I had just come back to Canada. I tried somebody very briefly, didn't like them at all, found that they just didn't know anything about eating disorders, and the person I had when I was in Germany was [emphasis] OK. He wasn't as good as this woman in terms of his experience, but he was very attentive to [me], and would address issues, and was also much more holistic... Germans just do more holistic stuff [herbals, meditation] than we do.

Part2
I guess, in my family, my mother has always sort of raised me .... She doesn't take a lot of medications and stuff; she's just sort of very natural and stuff like that. So, I was always more influenced to ride things out as opposed to treating medically.

Part3
I talk to her every day about my medical problems. She knows... usually before I go on the internet, I go to her. But because she's my mom, I don't trust her [laughing, jokingly], so I have to check with the internet.
Yeah, it's just good to, like, to hear what she thinks.
Oh she's judgmental, but I still tell her! Yeah, I can talk to her.

**Part 4**

The doctor [in Taiwan] just suggested that I should use this one [herbal medicine] and, like, have [a] regular diet…

Well, basically all them [both Western and TCM physicians in Taiwan] made suggestions similar [to exercise], yeah, so that's... yup.

Taekwondo [weekly class]
It's in Chinatown.

I would rather use a more natural way to... to get back [to normal; having a normal period].

Xenical is from the Western practitioner. The herbal medication is, I guess, [a] regular human hormone.

There's no specific name. [whispered]

There's, like, a whole bunch of stuff mixed together.

Not anymore. It was too dangerous. [Stopped taking xenical]
And it's not [natural]... [it's] unnatural.

'Cause my mother is in charge of his [her father's] health. [laughter]

**Part 5**

Mom gets the real food, and dad picks up juice, sometimes, juice and eggs, like that's the real basics my dad will pick up, but only because he's noticed that they're not around, because he wants them himself. [laughing] But that's OK.

As well, a contrast between the societal norms of mainstream Canadian society and specific minority groups, specifically Chinese ethnicity and nationality, was observed, as exemplified in excerpts below from Participants 4 and 5.

**Part 4**

I think it’s like most Asian[s] think that Westerners have, you know, like, [a] better body plan [shape].
They’re looking at the [Western] models. [That] type of thing. They’re talking about the models. And those are the ideal [figure].
Part 5

... yeah, absolutely, and sort of just mixing those values, what their expectations [are] with who you are, and I think it's a real identity strain for somebody like me. Like, I haven't sort of sat in bed thinking, you know, "it sucks to be Chinese and it sucks to be Canadian at the same time", but there is that duality that is very difficult...

So I think we're pretty advanced and I feel very lucky about that, that way, and they're quite Westernized. We're all pretty Westernized, you know. Like my parents... they don't have a very strict curfew for me, as long as I let them know where I am and, you know, so it's pretty good that way. Compared to some very traditional families, it could be a lot worse.

I don't eat seafood, never have, not because I'm allergic, but it's all psychological. It's very strange for someone who's Chinese not to eat seafood, and I don't.

I found this article on Chinese, basically the Chinese culture and mental illness [on the Web]. .... I mean it wasn't the best layout or anything, but it was a relatively brief article on, sort of, stigma and how Chinese people might have an extra cultural barrier when disclosing or having a mental illness, so that was kind of nice. Like for me, when I find information on the Web, like I find some of the most useful stuff is just personal accounts, like it doesn't have to be necessarily scientific, but just something where I can get a sense of, "I'm not the only person who has this", or, you know...

Like for me, finding that article on Chinese people and mental health was really good because it gave me an opportunity to think, "Oh, OK, so I'm not the only one, and my mom might not be the only one, and this is how... and this is what we're up against..."

5.7.6.1.3 Published studies on racial identity, ethnoracial identity and health information seeking on the Web

Historically, African Americans have been disproportionately affected by disparities in Internet access (Brodie, Flournoy, et al., 2000; Norris, 2001; Rainie, Madden, Boyce, Lenhart, Horrigan, Allen, and O'Grady, 2003; Margolis, 2008; Jackson, Zaho, Kolenic, Fitzgerald, Harold, and Von Eye, 2008). However, a recent study by the Pew Research Center (Fox, 2009) noted that the racial digital divide between Whites and Blacks in the United States is disappearing, which the researchers attributed to the relatively recent
prevalence of Internet access on mobile devices. Clearly, these small, portable devices are considerably less expensive than desktop and laptop computers. The growing number of wireless providers and free wireless in various public locations may also serve to diminish the racial digital divide. Altogether, the nature and magnitude of the racial digital divide requires ongoing monitoring. Furthermore, studies of racial differences should broaden beyond the narrow study of racial differences between Whites and Blacks, to an examination of racial differences that includes all racial groups because Arabs, Hispanics, Asians, and South Asians are increasing in number in both the United States and Canada.

Noting one participant’s need for health information in her native language (Chinese), it would seem that there is a need in Canada’s multicultural society for multilingual consumer health information publications. Stampino (2007) points out that while several organizations provide tailored multilingual publications for recent immigrants to Canada, multilingual health information may be difficult to locate and not readily available through major Canadian consumer health websites, replicating a finding from an environmental scan of women’s health information resources in the province of Ontario (Marton, 2000). Clearly, multilingual publications are required to meet the health information needs of a diverse population. However, health information resources must also be culturally relevant.

5.7.6.2 Occupation

In this study of women seeking health information on the Web, current occupation is positively related to the dependent variable, frequency of seeking health information on the Web.
5.7.6.2.1 Bivariate relationship between occupation and seeking health information on the Web

The statistically significant finding of a relationship between occupation and the dependent variable is observed solely for the Web as text-based content. Overall, study participants who are employed in the health care sector are twice as likely to use the Web for the purpose of finding health information, than participants who are not employed in the health care sector.

There are several plausible explanations for this research finding. In general, those working in the health care sector have greater access to high quality health information, including internally published clinical and consumer health print publications. They can consult the clinical literature through their institution’s medical library and its online journal literature databases. They can also readily learn about health conditions and their treatments from their colleagues, through both informal discussions and formal events, such as weekly clinical rounds. As well, they would have workplace access to the external or public Internet, which is likely to be pre-set to health websites, as well as having access to their institution’s intranet, which would feature extensive clinical and consumer health information.

Of equal importance is the health care worker’s domain knowledge and expertise. In general, health care workers possess university degrees in health sciences and may also possess specialized clinical skills. High health literacy facilitates the reading and understanding of health information, which is often impenetrable to the general public. It must also be acknowledged that for many healthcare workers, in particular, medical librarians, nurses, patient educators, provision of health information to clients is a significant part of their day-to-day work role, thus it is an embedded task.
5.7.6.2.2 Interview excerpts pertaining to occupation and health information seeking on the Web

Qualitative interview data from this study of women seeking health information on the Web supports the statistical finding of a relationship between health occupation and increased Web use. Clearly, studying or working in the health care sector or having a parent who is employed in the health care sector, influences the ability to read and understand online health information, and also influences preferences for specific health websites. Relevant excerpts from the subgroup of study participants with mental health conditions, which include a nurse, a psychology department research assistant, a social work graduate student whose mother is a physician, and a psychology undergraduate student whose mother is a pharmacist, are presented.

Part1

…as a nurse I feel I'm in a better position because I have some skill to assess what I read there, although I'm much better at assessing it if it's related to somebody else. If I'm searching for my mom or my sister, or for something work-related, I feel that I make better judgment calls than if I'm searching for myself.

…through my job, I come across good sources of information, but I find that for myself, personally, it's actually not, because… because I'm not my own nurse.

….I found them [colleagues] very helpful for… more for support than information. I found that I got the information myself pretty quickly. Sometimes I'd look for validation from them, about things I'd read.

It's also hard for me to know when I'm on the web doing health stuff, what's personal and what's professional, because they cross over.

Part2

When I was in university I would, when I was doing research for articles, I would also sort of do research for myself. But now I don't access to those things and I already know the research before it's published.
Part 3

Well I’ve been going through a whole ordeal with depression, and I did a lot of research on it on the internet. But I don’t know if any of them… Actually, but this isn’t the internet, because I’m a Psych student, so I’m learning about the things that are wrong with me. There’s been a… like lately… this month, in terms of my eating, there’s been a huge turn around.

I have three Psych courses and they’re all at the same time, so I mean… I know that what I’m doing is really, really bad. … well… I have an eating problem and a depression problem and they’re very related, which I never considered before. I’m taking that Physiological Psych…

Part 4

And, I did a lot of research on it myself. I come from a Life Sciences background, so basically, pre-med, and so I had a text[book] of pharmacology and I sort of flipped through it. And sort of coming from a very high achieving family, I always wanted to… I’m the type of patient that wants to know what’s going on. …. I also want to fully understand why something happens, why I need to switch medications, why I need that medication, [and] what that medication does for me, so I am very information-oriented for my own treatments.

5.7.6.2.3 Published studies on occupation and health information seeking on the Web

While Web use by clinicians has been studied, none have specifically examined the relationship between health occupation versus other occupations and frequency of using the Web to find health information. Casebeer, Bennett, Kristofco et al. (2002) researched the medical information-seeking behaviours of physicians and their relevance to continuing education providers who design and develop online CE activities. They found that almost all physicians have Internet access and know how to use it. A qualitative study of Web information seeking on osteoporosis by four groups of nurses with different combinations of Web expertise and domain expertise was conducted by Jenkins, Cooritore, and Wiedenbec (2003). Both domain expertise and Web expertise influenced nurses’ Web search strategies and assessment of online information. McKnight and Peet (2000) identified and analyzed 39 studies on clinician information seeking behaviour
published since 1990. They found that health care providers use the same information sources they used twenty years ago, in spite of the ready availability of online bibliographic and full-text health information sources.

At a more general level, studies have noted that employment status is a significant variable affecting Internet use (Bimber, 2000; Rainie, Madden, Boyce, et al., 2003) and seeking health information online (Rice, 2006). In Rice’s bivariate and multivariate analyses of the data from the Codebook for Pew Internet and American life’s Year 2000 Tracking Dataset, employment was a significant variable for both types of analyses, but not a significant variable in the bivariate and multivariate analyses of five subsequent Pew studies: Internet Health Resource report; Use of the Internet and Major Life Moment report; Getting Serious Online report; The Online Health Care Revolution report, and the Vital Decisions report (see Table 6, p. 21).

From the 1996 Census data detailed in Section 4.2.1.3 Occupation on pages 120-123, it was noted that Canadian women are more likely than Canadian men to be part-time employees, and predominate in certain sectors, such as financial services, and healthcare.

5.7.6.3 Household income

Household income affects the frequency of seeking health information on the Web.

5.7.6.3.1 Bivariate relationship between household income and seeking health information on the Web

The statistically significant relationship between household income and the dependent variable, frequency of seeking health information on the Web is observed for Web-based CMC information sources but not for text-based content websites. The directionality of
the relationship is as follows: those with higher household income used the Web more frequently to find health information from Web-based CMC channels. A caveat is required; the small number of study participants who used Web-based CMC to find health information online may account for the modest strength of this relationship.

5.7.6.3.2 Interview excerpts pertaining to household income and Web Use and health information seeking on the Web

Interview transcripts did not directly identify income as a significant influence on frequency of seeking health information on the Web. However, one interviewee noted that her access to Web CMC channels was limited because she used her father’s work computer at home and his employer, a large public sector organization, had blocked access to chatrooms. One can infer that her low income as a part-time research assistant made shared home computer and Internet access a necessity. Another participant, an undergraduate student who shared high speed Internet access with her roommate, but who had her own computer, did not experience this barrier to Web use.

5.7.6.3.3 Published studies on household income and health information seeking on the Web

Analyses of Statistics Canada survey data on Internet use in Canada by Middleton (Middleton and Sorenson, 2005; Middleton and Leith, 2007) revealed the ongoing existence of digital inequalities in Internet access in Canada according to income, education, and age. Similarly, the Statistics Canada publication by Underhill and McKeown on health information and the Internet, based on findings from the 2005 Canadian Internet Use survey, revealed online health information seekers in Canada are better educated and have a higher household income, compared to non-users (2008, p.2). As well, a
Pew Institute conducted in 2002 (Rainie, Madden, Boyce, et al., 2003) identified differences in income as one predictor of the digital divide in the United States. Furthermore, Hargittai’s studies on the digital divide (Hargittai and Hinnant, 2008; Hargittai and Walejko, 2008) revealed that socioeconomic status, a construct that includes household income but also other variables, is a strong predictor of Web use.

More broadly, from the 1996 census data discussed previously in Sections 4.2.1.3 Occupation, 4.2.1.4 Household income, and 4.2.1.7 Marital Status, it is evident that Canadian women have lower household incomes than Canadian men because they are more likely to work part-time in occupations that pay poorly, and are more likely to be divorced, separated, or widowed, than Canadian men.

5.8 Summary of study findings on demographic variables and seeking health information on the Web

A model of women seeking health information on the Web was developed and tested using quantitative and qualitative methods. The theoretical model sought to obtain a general understanding of the health information seeking behaviour of women using the Web. A set of causal factors were identified from an extensive review of the information science journal literature. The study focused on the relative influence of information source characteristics (quality and accessibility); perceived Web self-efficacy; health information needs pertaining to personal health conditions, and family caregiving (caregiver status, role and caregiving experience), as well as standard demographic variables, on the dependent variable, frequency of seeking health information on the Web (FSHIW). The empirical research collected data through an extensive Web survey, supplemented by data from interviews, Web log files, and journals of Web use.
The initial regression model was substantially revised in the form of three path analysis models, one for each of the three facets of the Web: Web as encyclopedia-style static textual content information-rich websites, and as two groups of asynchronous communication channels, in the form of chatrooms and bulletin boards, and listservs and newsgroups. The path analysis models found an important relationship between perceived reliability of the Web as a source of health information and frequency of Web use to find online health information, which was hypothesized in the original model. A comprehensive model that includes the significant study variables and demographic variables for one or more facets of the Web is presented below. Broken arrows indicate the existence of bivariate relationships for one or more facets of the Web, while solid arrows indicate the existence of bivariate relationships for all three facets of the Web.

Figure 5.1: Comprehensive model of frequency of seeking health information on the Web (FSHIW)
This exploratory multi-method study uncovered several positive bivariate relationships. First, the two situational factors, severity of health conditions and family caregiving role and experience, are positively related to frequency of seeking health information on the Web (FSHIW). This was observed for one or more of the three dimensions of the Web. Second, there are positive relationships between several information source variables; information source reliability and information source relevance; information source reliability and ease of reading and understanding information on health websites (cognitive access); and cognitive access on physical access. Lastly, three demographic variables, racial identity, household income, and occupation, affect the frequency of health information seeking on the Web. In addition, a relationship between racial identity and information source reliability was observed for both CMC facets of the Web: listservs and newsgroups, and bulletin boards and chatrooms, such that non-Caucasians rated the reliability of these facets of the Web higher than did Caucasians. More research is required to validate this finding.

While a direct relationship between information source relevance and the dependent variable was not observed in the statistical findings, the importance of the relevance of information on health websites was strongly evident in the interview data. Of great interest is the unique finding from this set of rich contextual data of the value of situational and affective relevance to mental health participants. These two dimensions of relevance represent fine grained dimensions of topical relevance and are consistent with the sense-making framework advanced by Brenda Dervin (1992), which is described in the Literature Review Chapter.
5.9 Research Contribution

This multi-method exploratory study confirms that frequency of seeking health information on the Web is influenced by several factors, including the perceived quality of the Web as a source of health information, and the situational context of this behaviour. Women spend more time seeking health information on the Web when health information on websites and Web CMC channels is perceived as reliable, in terms of comprehensiveness, authoritativeness, trustworthiness, and currency, and is relevant to their current health conditions and the situational and emotional context of these health conditions. Having high severity health conditions, being a family caregiver to children and having positive family caregiving experiences, are predictive of higher use of the Web to find health information online.

However, the relative influence of these predictors are not found consistently across the three dimensions of the Web, and the weak nature of relationships with the dependent variable indicate that these situational aspects of health information seeking online are of lesser importance than the contribution of information source factors. Longer-term contextual aspects, specifically several demographic variables, influence this Web use behaviour. Being employed in the healthcare sector is correlated with higher frequency of seeking health information on the Web from content websites, while having a higher household income results in increased frequency of seeking health information on the Web from Web-based CMC sources. Caucasians use content websites frequently while non-Caucasians use Web-based CMC sources extensively.

There are two unique findings from this multi-method exploratory study of women seeking health information on the Web. First, is the importance of user perceptions of information source reliability to seeking health information on the Web, which is supported by statistical analysis of survey data and thematic analysis of interview data and is consistently observed for the three dimensions of the Web: websites, Web-based
CMC (Bulletin boards/Chatrooms), and Web-based CMC (Listservs/Newsgroups). Users of Web-based CMC information sources whose perceptions of the reliability of the health information on these Web communication channels is high, are, in turn, inclined to regard the content on these Web-based information sources as highly relevant, which then predisposes them to spend more time using this type of Web information source. Clearly, user perceptions of information source reliability dominate in relation to their perceptions of the three other measures of information source characteristics: relevance, cognitive access, and physical access. The strength of the relationship between perceived information source reliability and perceived information source relevance may indicate that survey respondents interpreted the questionnaire items on information source relevance in terms of cognitive relevance. According to Saracevic (2007b, p. 1931), “Cognitive correspondence, informativeness, novelty, information quality, and the like are criteria by which cognitive relevance is inferred.”

Second, the finding from interview data and WebTracker log files of the importance of situational relevance as an indicator of information source quality is unique. Ruthven (2005) notes the dynamic nature of user assessments of relevance over time. Borlund (2003) suggests that relevance judgments evolve during the process of interaction with information retrieval systems and classified the manifestations of relevance as topical, situational, and cognitive relevance. Here, it is proposed that topical relevance is inadequate in addressing health information needs for participants with mental health conditions, and situational relevance represents a fine-grained sub-type of topical relevance. The concept of situational relevance is consistent with the sense-making framework which posits that problem situations give rise to information seeking (Dervin, 1992). Additionally, it is proposed that Saracevic's concept of motivational or affective relevance (1996) is a required attribute of health information because coping is an important dimension of living with health conditions.
5.10 Strengths of this study in relation to similar studies on this topic

The strengths of this study are identified as follows:

1. The conceptualization of the Web as three facets reflects its structure and functionality at the time the study was conducted (2000-2001). Differentiating between websites and Web-based CMC, instead of conceptualizing the Web as a singular information source, is unique in empirical research on a model of information seeking on the Web. All other studies on this topic have conceptualized the Web as a homogeneous medium, with the exception of Leung (2008, p. 7).

2. The selection of intensity (frequency) of Web use as the dependent variable stands in contrast to the operationalization of the dependent variable in other studies. Warner and Procaccino’s 2002 mail survey study did not include dependent variables, as their data analysis was restricted to paired t-tests (2004, 2007). Rice’s multivariate analyses (2006) of early Pew studies added dependent variables retrospectively to the original Pew data sets. Yoo (2004) studied intention to visit health websites, instead of the actual behaviour. Hong (2006) studied intention to revisit health websites. Leung (2008) studied online health information seeking in relation to Internet embeddedness.

3. The use of path analysis to determine which of the study variables should be retained in the revised model(s) and to study all possible relationships between the study variables is the most appropriate statistical technique. In comparison, Rice (2006) relied on multiple regression and logistic regression. Yoo (2004) mainly utilized hierarchical multiple regression to assess model fit, but acknowledged (p. 143) that that structural equation modeling is the most appropriate method. However, her attempt to employ SEM, more specifically, path analysis, was unsuccessful in that model fit statistics obtained failed to match her data set. Hong (2006) and Leung (2008) also relied on hierarchical multiple regression.
4. The strength of the statistical models obtained in this study, as measured by r-squared, is comparable to that observed in studies by Yoo (2004), Rice (2006), Hong (2006), and Leung (2008), but smaller than r-squared values obtained for the women in IT study (Marton and Choo, 2002).

5. The use of a Web survey questionnaire to study this Web use behavior was unique. All other studies on this topic employed more conventional survey distribution methods, either print questionnaires distributed through postal mail (Procaccino and Warner, 2004, 2007; Yoo, 2004) or telephone surveys (Pew Institute; Leung, 2008).

6. The use of a multi-method study design that included WebTracker log files, Web use journals, and in-depth interviews to contextualize this Web use behavior was also unique. Other studies relied solely on statistical analysis of survey questionnaires (Pew studies, Warner and Procaccino, 2004, 2007; Hong, 2004; Leung, 2008), or artificially studied this Web use behavior using an experimental design (Hong, 2006) that because of its artificial nature could not realistically capture this behavior.

5.11 Limitations

A limitation of this study concerns the population of the study. Because of reliance on the self-administered Web survey questionnaire for primary data collection, only experienced Web users were studied. Less skilled Web users were excluded, albeit not intentionally. Furthermore, since this is a study of health information seeking on the Web, there may have been some presumption on the part of potential respondents that experiencing health issues was a requirement for participation in this study. Those with none or few health issues may have been more likely to self-exclude themselves from participation in the study. Conversely, it is unlikely that those who were very ill with a serious health condition such as cancer would have chosen to participate in this study because of the debilitating nature of their illness. The smaller numbers in both groups, low and high severity of personal health conditions, limit the range of personal health conditions, and consequently, the breadth of health information needs.
Non-random sampling is known to introduce bias. In this study, purposive non-random sampling resulted in simultaneous over-representation and under-representation of demographic groups for several variables – racial identity, age, income, education, family caregiving, and Internet use/experience. This created biased estimates, which could explain to some extent why certain variables, such as Web self-efficacy, were not significantly related to the dependent variable, FSHIW, despite evidence from the journal literature to the contrary. Study participants were overwhelmingly Caucasian, urban, well-educated, middle-class, young, and childless, and thus, representative of the prime demographic for savvy Internet users, but not representative of women in the general public.

Another limitation pertaining to the Web survey questionnaire is the reliance on single-item statements to measure perceptions of information source quality and accessibility. This may act as a constraint on the study predictors, which are inherently multi-dimensional constructs. As well, the reliance on subjective measures should be reconsidered due to the difficulty some participants experienced in accurately assessing their perceptions.

Survey research provides retrospective data, gathered at a single point in time. Validity of the data is undermined by the accuracy of recall. The changing context of health information seeking on the Web in relation to personal health status and caregiver roles and tasks, as well as changes in Web technologies over time, argues for a longitudinal study design.
The wording of items, the reliance on single-item measures and self-assessed subject measures to represent specific predictors and test their relative influence on the dependent variable, may account for the lack of statistical significance. Moreover, the use of dichotomous and ordinal 5-point Likert-scaled items is less desirable than the use of interval variables. Missing values were substantial in number for several variables and under-power the estimation of the relationship with the dependent variable.

Another study design issue concerns the use of WebTracker software to capture sessions of health information seeking on the Web. Originally designed to operate with Netscape version 3, WebTracker was upgraded by the researcher to work with Netscape 4 with some measure of success, and also with Internet Explorer, but with considerably less success. Not all browser actions were accurately captured, and for some participants, WebTracker did not work at all. However, the addresses (URLs) of websites visited during the study timeframe were accurately captured for several participants, enabling the researcher to determine which health sites and CMC channels were utilized and how participants evaluated their quality and accessibility.

5.12 Future research

This study examined a limited set of predictors of the frequency of seeking health information on the Web. While a comparison of thirteen types of information sources was undertaken in relation to information source quality and information source accessibility, only descriptive data was gathered for these comparisons. The Web as a health information source was solely investigated in a rigorous, empirical manner in relation to these two information source variables, which have been widely studied in the field of library and information science. Examining how women seeking health information on the Web in relation to other health information sources and their perceptions of
information source usefulness represents a somewhat broader but viable research endeavour. A print mail survey that collected descriptive data on this research topic was conducted by Warner and Procaccino (2004, 2007). They found several interesting differences in women’s information search patterns and use. While Web users did not report that it was much easier to locate health information when compared to non-Web users, they did report greater success at finding health information than did non-Web users, and a higher level of usefulness for the information found. Furthermore, Web users reported that more of their health questions usually are answered as compared with non-Web users. However, non-Web users felt that they had obtained enough of the right kind of information more frequently than Web users. Although Web users communicated with medical professionals about the health information they had found at a somewhat higher rate than the non-Web users and reported being influenced by the health information more often than their non-Web counterparts, more non-Web users claimed to have made improvements in the way that they ate and the way that they exercised than did Web users. These comparisons between Web users and non-Web users with respect to information source accessibility and usefulness provide a good basis for empirical research on factors affecting how women seek health information in relation to information source usefulness.

Validation of this model of health information seeking on the Web through replication studies is worth further investigation. This could entail examining alternative ways of measuring the set of predictors examined in this study with less reliance on subjective measures and greater use of interval-level variables. For studies of online health information seeking that include participants with a range of health conditions, the use of standard measures of health status, should be considered. For example, the Short-Form 36 Health Survey (SF-36) is a survey of patient health derived from the Medical Outcomes Study (MOS) conducted by the Rand Corporation. The Health Utility Index
is based on the Health Status Measurement System. It describes overall functional health by measuring eight attributes. The impact-of-health scale adapted by Lasser, Himmelstein, and Woolhandler (2006) from the World Health Organization’s International Classification of Functioning, which has both good validity and reliability, asks the broad question, “How often does a long-term physical condition or mental condition or health problem reduce the amount or the kind of activity you can do at home, at school, at work, and in other activities…?” (p. 1301). Simply asking study participants to list their health conditions, as well as to rate them according to one or more of these measures, would enable researchers to more accurately determine what aspects of health and illness initiate information seeking. As well, validation could conceivably entail obtaining a study sample of women who have one health condition only, such as breast cancer, which would reduce the heterogeneity of the sample in terms of health status, and enable researchers to pinpoint which characteristics of online health information seeking are associated with a specific health condition, if any.

Proper specification of the model requires that all predictors are included in the model. Thus, replication studies should endeavour to include other causal factors that were not considered in this study. A consideration of cognitive and affective variables from health psychology theories, such as the theory of planned behavior, is recommended. Yoo (2004) examined the influence of these variables on intent to seek health information on the Web, but not on actual health information seeking on the Web. Replication studies could also examine other dependent variables, such as user satisfaction with health websites. The recently published framework on women’s information behaviour (Urquhart and Yeoman, 2010) which integrates main themes from feminist research and information behaviour research may provide a useful theoretical context for further research on the topic of women seeking health information on the Web.
The overall greater strength of the relationships between predictors and frequency of seeking health information on the Web observed in this study for Web communication channels also merits further investigation. Web-based CMC represents the information sharing dimension of the original Web (Web 1.0) and can legitimately be viewed as the precursor to Web 2.0, commonly referred to as the Social Web (Bernoff and Li, 2008; Murray, 2008; Silver, 2008, Notess, 2009). Based on the qualitative interview data on information source reliability from this study, it is predicted that concerns about the reliability of health information in this new Web environment, in particular, its authoritativeness and accuracy, will be heightened when Web users visit and interact with social websites, such as Facebook and MySpace. At the same time, situational relevance is predicted to be higher on these sites, because of the opportunities they offer for creating user-generated content on any topic of interest, around which an engaged community of interest can arise and potentially grow to become a world-wide membership. Web 2.0 technologies facilitate information sharing and the ready use of multimedia elements, such as photos, audio clips, and videos, often of personal activities, experiences, and events, as well as mixing these technologies and creating so-called mash-ups. Anyone can create content using readily available suites of online tools; sophisticated computing skills are not required.

The presence of health condition-specific content on Web 2.0 channels such as blogs, Twitter feeds, and Facebook sites, created by individuals with cancer, diabetes, and other health conditions, with broad participation from their large membership base of fellow sufferers, is proof that Web 2.0 technologies are being used for the purpose of creating highly situation-specific content on individual health conditions by those who are afflicted by these conditions (Murray, 2008; Harvey, 2010). More generally, personalized websites are becoming the norm (Miller, 2010). The Social Web, with its emphasis on
information sharing, interactivity, reciprocity, and activism, represents an extension of the Web-based CMC channels examined in this study, and holds forth the promise of improved situational relevance for health information on the Web, as well as greater social cohesion.

The personalized approach to consumer health information on the Web characteristic of Web 2.0 websites developed by individuals with specific illnesses stands in stark contrast to what is offered by reputable, established consumer health information websites developed in the 1990s and early in this decade, and authored by professionals who control the publication of content, such as such as WebMD and MedlinePlus in the United States and MedBroadcast in Canada. Clearly, these types of consumer health information websites function predominantly as distributors of textbook-style biomedical information. The content is predominantly static text, with a limited selection of images of organs and organ systems, and a limited number of decision making tools such as body mass indicator calculators, and optionally, one or more forms of computer-mediated communication, such as discussion forums. While these sites do not exemplify the latest trends in Web technology, they do meet the fundamental needs of those seeking health information: the need for factual information about diseases and their treatment.

Consumer health information websites are late adopters of Web 2.0 technologies. In 2010, the Consumer Health Information Providers interest Group of the Canadian Health Libraries Association published a new version of its “Top 10 Canadian Consumer Health Websites (CHIPIG, 2010). While all of the top ten sites listed provide extensive and well-organized text-based content, hypertext links, static images, and a site search engine, adoption of Web 2.0 technologies is limited. At present, the Heart and Stroke Foundation has a Twitter feed and Facebook site; Women’s Health Matters has a Twitter feed and an RSS feed, Here to Help
(mental health) has an RSS feed; Caring for Kids has a Twitter feed and a Facebook site, and Passport Santé has blogs authored by health professionals, as well as a Twitter feed and a Facebook site. The Canadian Cancer Society and sexualityandu.ca are leaders in the adoption of Web 2.0 technologies. Both have a Twitter feed, a Facebook site, a YouTube channel or streaming video on-site, and a Share button with icon links to many social sites such as Bebo and Delicious. Examining the postings in the Twitter feeds of these consumer health information sites reveals their recent nature; the first postings date back to 2009. Since consumer health information websites were developed before the advent of Web 2.0, and Web 2.0 technologies were adopted very recently as additions to existing content, studying Web users’ perceptions of the quality and accessibility of these new facets of the Web, as well as their perceptions of the quality and accessibility of the older forms of content on these sites, the static text and Web-based CMC, would represent another interesting extension of this study. Given the growing concerns over the privacy and security of personal information shared on Web 2.0 sites such as Facebook (Barnes, 2006; Harvey, 2010; Murray, 2008; Rosen, 2010), user perceptions of privacy and security must be included in future research on health information seeking on the Web.

As we look back on the evolution of the Web from its inception in the mid-nineties, it is evident that the Web has become a meta-medium that incorporates many technologies and sources of information. Yet, a popular expression comes to mind, “the more things change, the more they remain the same.” As the Web has evolved from its origins as static text with embedded hyperlinks stored on networked computers connected by Internet protocols, to include multimedia, interactivity, interfaces to searchable databases, and suites of online applications, Web users are faced with the same fundamental concerns: how to access content on the Web and understand it, and how to judge its reliability and its relevance to personal needs. The variables examined in this study still provide a viable model for empirical research on the topic of how women seek health information on the Web.
5.13 Conclusions

The purpose of this dissertation has been to examine the role of selected information source factors and situational factors in a gendered Web use behaviour: women seeking health information on the Web. The conceptual framework was constructed on theoretical foundations in information science and health sciences. The independent variables in the conceptual framework were information source quality (relevance and reliability) and access (physical and cognitive access), Web self-efficacy, family caregiving role and experience, and uncertainty associated with health information need arising from personal health conditions. Although not included in the theoretical model, seven socio-demographic variables commonly studied in the social sciences and health sciences disciplines were studied: age, household income, ethnoracial identity, language, education, marital status, and geographic location. The dependent variable was frequency of seeking health information on the Web, whereby the Web was conceptualized as three facets: website content and Web-based computer-mediated communication channels: bulletin boards and chatrooms, and listservs and newsgroups.

Data was collected from 264 women, many living in Toronto, by means of a Web survey questionnaire that was online in the winter months of 2000-2001. A subset of Web survey respondents completed other components of this multi-method study: semi-structured in-depth interviews, and system-generated records (Web logs and history files of sessions of online health information seeking and bookmarks of health websites) and user generated records (a journal of these Web use sessions, including ratings of websites visited). These Web logs and diaries were discussed in detail in the interviews within the context of the study variables.
Analysis of the data revealed the primacy of information source reliability as a factor affecting frequency of health information seeking on the Web, and unexpected findings of positive relationships between this variable and two other information source characteristics, relevance, a measure of information source quality, and cognitive access, the ease of reading and comprehending online health information. Qualitative interview data suggest that situational relevance is very important to this group of Web users. While information source access variables did not affect frequency of health information seeking on the Web, cognitive access influenced perceptions of physical access to the Web. The two situational factors, health information need and family caregiving, exerted only weak influences on the dependent variable, and the effect of severity of health conditions, a post-study objective measure of health information need, on the dependent variable, was limited to one facet of the Web, website content. With respect to socio-demographic variables, race, household income, and occupation, were found to influence frequency of seeking health information on the Web.

This study contributes to an improved understanding of the process by which women seek health information on the Web. The results point to the important role that perceived information source reliability plays in this process. Health content websites that are viewed as highly reliable engender more Web use, as well as more positive perceptions of the relevance of health information on the Web, and its readability and comprehension. Socio-demographic differences affect this behaviour. However, more balanced study samples are required so that the nature and extent of these differences can be better understood.
There is an extensive journal literature on health information on the Web, with the first article on this topic indexed in MEDLINE in 1995. However, fewer than ten empirical studies that build and test a model of health information seeking on the Web have been published to-date. In this decade, rigorous research on the factors affecting the use of the Web to find health information is long overdue.
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Appendix A: Web Survey Questionnaire including introduction to the study and online consent form
To increase the size of the text on this page, use the Netscape menu option: View-Increase Font. For Microsoft Internet Explorer, use the menu option: View-Text Size-Larger.

**Invitation to Participate**

Greetings! Thank you for visiting the study website! \nIf you are a woman who uses the Web to find health information, you are invited to participate in this study.  
Please find below, a detailed description of the study and how to get involved. Your time and effort in reading this information and participating in the study is greatly appreciated.

**Who can participate?**

Women of all ages and backgrounds and health experiences are invited to participate in this study.  
I am interested in your honest opinions on your use of the Web for health information seeking, as well as your use of other health information sources, such as health care practitioners, print publications, videos and television.  
For all components except the online questionnaire, you must have a computer (IBM-compatible PCs only) with Internet access at home and use Netscape 4 or Microsoft Explorer 5 as your Web browser. You must also be residing in the Greater Toronto Area to complete components 2-4 of this study.

**NOTE:**

If you do NOT live in the Toronto area, BUT are willing to participate remotely through completion of the two interviews (approximately 1 hour each) by phone or through Internet communication software, like Microsoft Chat or CUSeeMe, and have experience downloading software from the Web and installing it on your home computer, you can participate in ALL components of the study. If this is not the case, please feel free to complete the questionnaire by scrolling to the bottom of this page and clicking to proceed to the questionnaire. Your participation is valued.
Purpose of the research

It is well known that women look for health information for themselves and others to a much greater extent than men, yet little research has been done on how women search for health information. Although the World Wide Web (Web) is one of the most popular sources for health information today, its use for this purpose has not been researched a great deal. I anticipate that women search the Web in unique ways. I would like to investigate how women use the Web to find health information. I would also like to research how women's health information needs and their responsibilities as family caregivers influence their searching. Finally, I would like to understand how women's confidence in their ability to use the Web and the characteristics of the Web itself make it difficult or easy for women to search for health information on the Web.

Who is conducting the research?

Christine Marton is a fourth year doctoral student in the Faculty of Information Studies at the University of Toronto. She has a background in human biology and information science.

Procedures

There are four parts to this study.

1. completion of a survey questionnaire You can answer as little or as much of this questionnaire as you like. Completion time for the online questionnaire is 30 minutes.
2. two face-to-face interviews with the researcher, one at the beginning of the study and the second at the end of the study, which will be tape-recorded
3. keeping a journal of your use of the Web for finding health information
4. permitting the collection of data on your Web activities, which involves the collection of bookmark and history files and the installation of a Web tracker application that records your moves on the Web [read About WebTracker]

To begin, please complete the questionnaire first and email the researcher at marton@fis.utoronto.ca to participate in parts 2-4 of the study. Your participation in this study is greatly valued.

How long is the study?

The duration of this study in its entirety is approximately 1 month. You are free to withdraw from this study at any time. Please provide the researcher with written notice of your decision to terminate your involvement one week prior to termination.

Confidentiality

All data will be kept confidential. All identifying information will be removed from the data once data analysis has been completed. The tape recordings of interviews will be destroyed after transcription by the
researcher. All data files, including questionnaires, journals and Web activity files will be stored in a secure location during the study and for five years hence, at which time they will be destroyed by the researcher. Only group responses (aggregate data) will be reported in publications and presentations pertaining to this study. You will not be identified in reports on this study.

**Publicizing results**

Preliminary study results will be published on the study website 6 months after the completion of the study. Please visit this webpage for updates regarding presentation of the results at conferences and in print publications.

**Benefits**

Researching women's health information-seeking behaviour on the Web will deepen our understanding of how women use the Web to locate and utilize health information and the context of their health information-seeking behaviour. These findings will help to improve the design of health websites, making them easier to use and more interesting to women. Those who complete the questionnaire in its entirety will have the opportunity to win $100 in a draw. Those participating in all aspects of the study will receive $50 reimbursement.

**Contact information**

If you have any questions or concerns about your participation in this study, please contact Christine Marton by email at marton@fis.utoronto.ca or by phone, 416-978-7099 or Professor Choo at choo@fis.utoronto.ca.

**Funding**

This study is funded by a doctoral fellowship from the Medical Library Association and the Institute for Scientific Information.

Please click here to proceed to the questionnaire homepage.

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Return to the Top of the page

Return to the Faculty of Information Studies home page

Please note:
I will be out of the office February 5-6, 8-9, 12-14. I will respond to email messages on February 7th and 10th.
[Last updated: Friday, February 2, 2001, 4:00pm EST]
Purpose of the Questionnaire
This questionnaire was developed by Christine Marton, a doctoral student in the Faculty of Information Studies at the University of Toronto. The purpose of the questionnaire is to investigate women's use of the Web to find health information and to determine how their health information-seeking behaviour is affected by their health information needs, caregiver role, perceptions of their ability to use the Web, and perceptions of the quality and accessibility of Web-based health information sources.

Confidentiality
Any data that could identify you (e.g. email address) and the information you have provided for this study will be kept confidential. All data collected will be securely stored by the Researcher and will be destroyed five years after completion of the study. If you have any questions or concerns about your participation in this study, please contact Christine Marton, 416-699-0591 or marton@fis.utoronto.ca, or Professor Chun Wei Choo at choo@fis.utoronto.ca.

Funding
This study is funded by a doctoral fellowship from the Medical Library Association and the Institute for Scientific Information.

Consent
Please read the following statements carefully.

1. I have freely consented to the collection of questionnaire data.
2. I have been informed in advance about the nature of the study, what my tasks would be and what procedures will be followed.
3. I understand that the information that I provide will be treated confidentially and that my identity will not be revealed in the reporting of the study results.
Click on the **Submit button** to indicate that you understand the purpose of this study and that you consent to the collection of complete data from this questionnaire for the purpose of data analysis of your patterns of Web use.

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Press click on the **Submit button**

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Thank you for consenting to be part of this survey

*Return to the Study Homepage*

*Return to the Questionnaire Homepage*

*Proceed to Part A*
Web Survey Questionnaire
Part A: General Use of the World Wide Web

Faculty of Information Studies
University of Toronto
140 St. George Street
Toronto, Ontario M5S 3G6

Section A contains questions pertaining to your general use of the World Wide Web (Web).

A1
How long have you been using the Web (for any and all purposes)?
Click on the downward arrow and scroll down the list of options.
Then select the option that best describes how you feel by clicking on it.

A2
In general, how often do you access the Web (for any reason) from each of the following locations?
Please select the most appropriate choice for each statement by clicking on the circle that best indicates your response.

<table>
<thead>
<tr>
<th>Location</th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Less than once a month</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Home</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>b. Work</td>
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<td>c. School/College/University</td>
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<tr>
<td>d. Public Library</td>
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<tr>
<td>e. Family member/friend</td>
<td>☐</td>
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</tr>
<tr>
<td>f. Other (please specify)</td>
<td>☐</td>
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<td>☐</td>
</tr>
</tbody>
</table>

Please specify other types of Web access (please type in box)
A3
Which of the following connection speeds do you primarily use to connect to the Internet?
If you access the Internet at home via a commercial provider, choose the speed from you to your Internet provider.
Click on the downward arrow and scroll down the list of options.
Then select the option that best describes how you feel by clicking on it.

A4
Is your access to the Internet at home solely your own?  ☐ Yes  ☐ No
Please select the most appropriate choice by clicking on the circle that best indicates your response.

A5
If your Internet account at home is shared, with whom is it shared?
Please check all that apply by clicking on the appropriate boxes.

☐ Spouse/Partner
☐ Children
☐ Sister
☐ Brother
☐ Others
Please specify other users (please type in box)

A6
What do you primarily use the Web for?
Please check all that apply by clicking on the appropriate boxes.

☐ Gathering information for personal needs
☐ Education
☐ Shopping/gathering product information
☐ Recreation/leisure
☐ Work/Business
☐ Communication with others (not including email)
A7

How confident do you feel about your ability to use the Web for information seeking?

**Please select the most appropriate choice for each statement by clicking on the circle that best indicates your response.**

<table>
<thead>
<tr>
<th>I can use a NEW Web browser to find information on the Web:</th>
<th>Not at all confident</th>
<th>A little confident</th>
<th>Moderately confident</th>
<th>Fairly confident</th>
<th>Completely confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ...if I had never used any kind of Web browser before.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>b. ...if I had seen someone else using it before trying it myself.</td>
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<td></td>
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</tr>
<tr>
<td>c. ...if someone had offered me assistance in getting started.</td>
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<td></td>
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</tr>
<tr>
<td>d. ...if someone offers me assistance when I have a problem.</td>
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</tr>
<tr>
<td>e. ...if I had just the built-in help facility for assistance.</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>f. ...if I had a lot of time to figure out how to use it.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Thank you for completing Part A. Please proceed to Part B.

Please click on the **Submit button** to complete this part of the questionnaire.
Thank you for completing
Part A: General Use of the World Wide Web

Return to the Study Homepage
Return to the Questionnaire Homepage

Proceed to Part B
Section B contains questions pertaining to your use of Web-based information sources to find health information.

**B1**
Do you use the Web to obtain health-related information from content websites?  
Yes □  No □  
Content is defined as text and images that are informative.

Please list the health websites you most frequently visit.

**B2**
Apart from personal email, do you use the Web to communicate with others or ask others questions about health?  
Yes □  No □  
Please list the health communication sources (bulletin board service, chatroom, newsgroups, listservs) you most frequently visit.

**B3**
Do you use the Web to obtain health-related information on a weekly basis?  
Yes □  No □  
If yes, please continue to questions B4 and B5.  
If no, please scroll to the bottom of this page and click the submit button to begin Part C.
B4
On average, how many **hours a week in total** do you spend on the Web looking for health information, using each of the following Web-based information sources? *Please select the most appropriate choice for each statement.*

<table>
<thead>
<tr>
<th></th>
<th>never</th>
<th>less than 1</th>
<th>1-2</th>
<th>3-5</th>
<th>6-10</th>
<th>over 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. website content</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(informative text and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>image-based websites)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>b. web-based search engine</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(e.g. Alta Vista, Yahoo)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. web-based bulletin</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>board or chatroom</td>
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<tr>
<td>(communications)</td>
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<tr>
<td>d. listserv/discussion</td>
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<tr>
<td>group or newsgroup</td>
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<tr>
<td>e. other (please specify)</td>
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</tr>
</tbody>
</table>

*Please specify other Web-based information sources used (please type in box)*

B5
*During* an typical Web session for health information seeking, how much **time (in hours)** do you spend looking for health information, using each of the following Web-based information sources? *Please select the most appropriate choice for each statement.*

<table>
<thead>
<tr>
<th></th>
<th>never</th>
<th>less than 1</th>
<th>1-2</th>
<th>3-4</th>
<th>5-6</th>
<th>over 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. website content</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>(informative text and</td>
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<tr>
<td>image-based websites)</td>
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<tr>
<td>(e.g. Alta Vista, Yahoo)</td>
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<tr>
<td>c. web-based bulletin</td>
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<tr>
<td>board or chatroom</td>
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<tr>
<td>(communications)</td>
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</tbody>
</table>
Thank you for completing Part B. Please proceed to Part C.

Please click on the Submit button to complete this part of the questionnaire.

Submit
Thank you for completing
Part B: Using the Web to find health information

Return to the Study Homepage

Return to the Questionnaire Homepage

Proceed to Part C
Web Survey Questionnaire
Part C: Perceptions of Web-Based Health Information Sources

Faculty of Information Studies
University of Toronto
140 St. George Street
Toronto, Ontario M5S 3G6

Section C contains questions pertaining to your perceptions of the quality and accessibility of different types of sources of health information.

C1
In general, how much of your time and effort is needed to approach, contact, or locate each information source?
For Web-based information sources (a-c), time and effort to approach, contact, or locate an information source refers to the time and effort required to access the Web from your computer, e.g. modem dial-up time, and to download a Web-based information source to your screen, e.g. time to load a website.

Please select the most appropriate choice for each information source.

<table>
<thead>
<tr>
<th>Source</th>
<th>Very little</th>
<th>Little</th>
<th>Some</th>
<th>A lot</th>
<th>A great deal</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. websites</td>
<td></td>
<td></td>
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<tr>
<td>b. web-based bulletin boards or chatrooms</td>
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<tr>
<td>c. listservs or newsgroups</td>
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<tr>
<td>d. pamphlets or fact sheets</td>
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<tr>
<td>e. newspapers or magazines</td>
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<td>f. books</td>
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<tr>
<td>g. television programs</td>
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<tr>
<td>h. radio programs</td>
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<tr>
<td>i. videos</td>
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<td>j. CD-ROMs</td>
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<td>k. family members or friends</td>
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<tr>
<td>l. librarians</td>
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<tr>
<td>m. healthcare practitioners (e.g. doctor, nurse, physiotherapist)</td>
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</tbody>
</table>
After contacting or locating the information source, **how easy is it** to get the desired information from that source?

For Web-based information sources (a-c), getting the desired information from a source refers to ease of navigation (e.g. through hypertext links and search engines) within a source, as well as how the readability of the information (quality of text, graphics, and design elements) affects your ability to obtain information from that source.

**Please select the most appropriate choice for each information source.**

<table>
<thead>
<tr>
<th>Information Source</th>
<th>Very Easy 1</th>
<th>Easy 2</th>
<th>Neither Easy nor Difficult 3</th>
<th>Difficult 4</th>
<th>Very Difficult 5</th>
<th>Don't Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. websites</td>
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<td>b. web-based bulletin boards or chatrooms</td>
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<td>l. librarians</td>
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<tr>
<td>m. healthcare practitioners (e.g. doctor, nurse, physiotherapist)</td>
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</table>

| n. other source (specify)                                                        |             |        |                               |             |                  |            |
| o. other source (specify)                                                        |             |        |                               |             |                  |            |
C3
How relevant is the health information obtained from each information source?
For all information sources, relevant health information is health information that is needed and useful with respect to your health and/or the health of those your care for. It is often considered to be comprehensive and timely.

<table>
<thead>
<tr>
<th>Please select the most appropriate choice for each information source.</th>
<th>Very irrelevant 1</th>
<th>Fairly irrelevant 2</th>
<th>Of some relevance 3</th>
<th>Fairly relevant 4</th>
<th>Very relevant 5</th>
<th>Don't know 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. websites</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
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<tr>
<td>b. web-based bulletin boards or chatrooms</td>
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<tr>
<td>c. listservs or newsgroups</td>
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<td>h. radio programs</td>
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<tr>
<td>i. videos</td>
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<tr>
<td>j. CD-ROMs</td>
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<td>☒</td>
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<tr>
<td>k. family members or friends</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
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<td>☒</td>
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<tr>
<td>l. librarians</td>
<td>☒</td>
<td>☒</td>
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<tr>
<td>m. healthcare practitioners (e.g. doctor, nurse, physiotherapist)</td>
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<td>☒</td>
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<td>☒</td>
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<tr>
<td>n. other source (specify)</td>
<td>☒</td>
<td>☒</td>
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<td>☒</td>
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<tr>
<td>o. other source (specify)</td>
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</tbody>
</table>
C4
How **reliable** is the health information from each information source?
For all information sources, reliable health information is health information that is **authoritative (credible) and dependable**.
Reliable health information is information that you personally trust.

<table>
<thead>
<tr>
<th>Please select the most appropriate choice for each information source.</th>
<th>Very unreliable 1</th>
<th>Unreliable 2</th>
<th>Somewhat reliable 3</th>
<th>Fairly reliable 4</th>
<th>Very reliable 5</th>
<th>Don’t know 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. websites</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b. web-based bulletin boards or chatrooms</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
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<tr>
<td>c. listservs or newsgroups</td>
<td>☐</td>
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<tr>
<td>d. pamphlets or fact sheets</td>
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<td>☐</td>
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<tr>
<td>e. newspapers or magazines</td>
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<td>☐</td>
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<td>f. books</td>
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<td>g. television programs</td>
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<td>h. radio programs</td>
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<td>i. videos</td>
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<tr>
<td>j. CD-ROMs</td>
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<tr>
<td>k. family members or friends</td>
<td>☐</td>
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<tr>
<td>l. librarians</td>
<td>☐</td>
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<tr>
<td>m. healthcare practitioners (e.g. doctor, nurse, physiotherapist)</td>
<td>☐</td>
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<tr>
<td>n. other source (specify)</td>
<td>☐</td>
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<tr>
<td>o. other source (specify)</td>
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</tbody>
</table>

Thank you for completing Part C. Please proceed to Part D.

Please Click on the **Submit button** to complete this part of the questionnaire.
Thank you for completing
Part C: Using the Web to find health information

Return to the Study Homepage
Return to the Questionnaire Homepage

Proceed to Part D
Web Survey Questionnaire
Part D: Health concerns and information needs
Faculty of Information Studies
University of Toronto
140 St. George Street
Toronto, Ontario M5S 3G6

Part D contains questions pertaining to your personal and caregiver-related health concerns, in terms of health problems and illnesses that have led you to look for health information.

D1
Over the past three months, what health concerns have you personally experienced, pertaining to your own health status that led you to look for health information?

Please list in the space provided, each health condition you have personally experienced that led to information seeking.
For each personal health condition that led to information seeking, please rate the amount of uncertainty you experienced when the health information need arose by clicking on the circle representing the option that best describes how you feel.
Uncertainty is defined as the inability to decide what to do with respect to your health concern(s).

<table>
<thead>
<tr>
<th>Name of Health Condition</th>
<th>No uncertainty 0</th>
<th>Some uncertainty 1</th>
<th>A lot of uncertainty 2</th>
<th>Extreme uncertainty 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>condition 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>condition 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>condition 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>condition 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>condition 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The next question pertains to health concerns of family members you care for.
If you are not currently a family caregiver (providing unpaid care to family members), please scroll down this page and click the SUBMIT button to continue to Part E.
D2
Over the past three months, what health concerns have those you care for as a family caregiver experienced, that led you to look for health information?

Please list in the space provided, each health condition your caregiving recipient has experienced that led to information seeking. If you are caring for more than one family member, choose the individual for whom you are providing the most care. For each personal health condition that led to information seeking, please rate the amount of uncertainty you experienced when the health information need arose by clicking on the circle representing the option that best describes how you feel. Uncertainty is defined as the inability to decide what to do with respect to the health concern(s) of your caregiving recipient.

<table>
<thead>
<tr>
<th>Name of Health Condition</th>
<th>No uncertainty 0</th>
<th>Some uncertainty 1</th>
<th>A lot of uncertainty 2</th>
<th>Extreme uncertainty 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>condition 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>condition 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>condition 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>condition 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>condition 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please specify your relationship to the care recipient. (spouse, mother, daughter, sister)

Thank you for completing Part D. Please proceed to Part E.

Please click on the **Submit button** to complete this part of the questionnaire.
Thank you for completing
Part D: Using the Web to find health information

Return to the Study Homepage
Return to the Questionnaire Homepage

Proceed to Part E
Part E contains questions pertaining to your experiences as a family caregiver.

E1
Do you currently provide care to one or more family members?  
☐ Yes  ☐ No

If yes, please continue to question E2 below.
If no, please scroll to the bottom of this page and click the SUBMIT button to continue to Part F.

E2
Please select ALL individuals for whom you provide caregiving, according to their relationship with you.

☐ child under 1  ☐ child 1-5  ☐ child 6-10  ☐ child 11-15  ☐ child 16-20  ☐ child over 20
☐ spouse/partner
☐ parent-mother  ☐ parent-father
☐ sibling-sister  ☐ sibling-brother
☐ Other (please specify)
Please describe your feelings about your caregiving situation and responsibilities towards your care recipient by completing each of the statements below. Care recipient is the family member for whom you provide the most caregiving.

Please select the most appropriate choice for each information source.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. I feel privileged to care for my care recipient.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b. My financial resources are adequate to pay for things that are required for caregiving.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c. It is very difficult to get help from my family in taking care of my care recipient.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>d. I have to stop in the middle of my work or activities to provide care.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>e. I really want to care for my care recipient.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>f. I have eliminated things from my schedule since caring for my care recipient.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>g. I have enough physical strength to care for my care recipient.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>h. Since caring for my care recipient, I feel my family has abandoned me.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>i. I am healthy enough to care for my care recipient.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>j. Caring for my care recipient puts a financial strain on me.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>k. I enjoy caring for my care recipient.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>l. Since caring for my care recipient, it seems like I'm tired all of the time.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Thank you for completing Part E. Please proceed to Part F.

Please click on the Submit button to complete this part of the questionnaire.
Thank you for completing
Part E: Using the Web to find health information

Return to the Study Homepage

Return to the Questionnaire Homepage

Proceed to Part F
Web Survey Questionnaire

Part F: Background Information

Faculty of Information Studies
University of Toronto
140 St. George Street
Toronto, Ontario M5S 3G6

Part F contains questions pertaining to your personal identity. The information provided in Part F will be used to help determine whether women with different backgrounds vary with respect to their health information-seeking behaviour on the Web. Answering these questions is strictly voluntary, but would be appreciated.

F1
What is your age?
Click on the downward arrow and scroll down the list of options.
Then select the option that best describes how you feel by clicking on it.

F2
Where in Canada are you located?
If you are located in Canada, please complete question F2 and proceed to F4.
If you are not located in Canada, please proceed to F3.

F3
Where are you located (if residing outside of Canada)?

F4
Please list your present occupation.

F5
Please indicate your current household income in Canadian dollars.
F6
Please indicate the highest level of education completed.

None

If other, please specify.

F7
What is your primary language (i.e., the one you speak most of the time)?

scroll down

If other, please specify.

F8
Please indicate your current marital status.

scroll down

F9
Please indicate your racial identity.

scroll down

F10
Please describe how you found out about this study.

Thank you for completing Part F. Please proceed to Part G.

Please click on the Submit button to complete this part of the questionnaire.
Thank you for completing
Part F: Using the Web to find health information

Return to the Study Homepage
Return to the Questionnaire Homepage
Proceed to Part G
Please use the space provided below to address areas of concern that were not included in the survey, but which you feel are relevant to your use of the Web to find health information. As well, your comments concerning the questionnaire are welcomed.

Thank you for taking the time and effort to answer these questions.

Please click on the **Submit button** to complete this part of the questionnaire.
Thank you for completing
Part G: Using the Web to find health information

Return to the Study Homepage

Return to the Questionnaire Homepage

Please let us know how we may contact you should you win one of our prizes

name: 


e-mail address: 

Submit

Upon submitting this information you will be returned to the Study Homepage.

Thank you for participating in our survey!
Appendix B: Consent forms

Understanding how women seek health information on the Web

Participant Consent Form for Interview 1

This interview on personal experiences of health and illness and caregiver experiences is being conducted by Christine Marton, a doctoral student in the Faculty of Information Studies at the University of Toronto. The duration of the interview is approximately 1 hour.

Your written consent is required for this study. Your signature below implies consent to participate in the interview and the audiotaping of this interview for the purpose of transcription and data analysis of your personal health experiences and caregiving experiences, and your use of health information sources pertaining to health.

Your name and the information you have provided for this study will be kept confidential. All data collected will be securely stored by the Researcher and will be destroyed five years after completion of the study. You will receive $10 reimbursement for your participation in this component of the study.

If you have any questions or concerns about your participation in this study, please contact Christine Marton, 416-699-0591 or marton@fis.utoronto.ca or Chun Wei Choo (supervisor) at choo@fis.utoronto.ca.

Please sign below if you agree with all of the following statements:

1. I have freely volunteered to participate in this interview.
2. I have agreed to permit audiotaping of this interview.
3. I have been informed in advance about the nature of the study, what my tasks would be and what procedures will be followed.
4. I have been given the opportunity to ask questions and have had my questions answered to my satisfaction.
5. I understand that the information that I provide will be treated confidentially and that my identity will not be revealed in the reporting of the study results.
6. I am aware that I have the right to withdraw my consent and discontinue participation at any time.

Participant’s First and Last Name (please print)  First and Last Name (please sign)

Christine Marton, researcher  Date
Understanding how women seek health information on the Web

Participant Consent Form for Interview 2

This interview on women’s use of the Web to locate health information is being conducted by Christine Marton, a doctoral student in the Faculty of Information Studies at the University of Toronto. The duration of the interview is approximately 2 hours.

Your written consent is required for this study. Your signature below implies consent to participate in the interview and the audiotaping of this interview for the purpose of transcription and data analysis of your use of Web-based information sources pertaining to health. Your name and the information you have provided for this study will be kept confidential. All data collected will be securely stored by the Researcher and will be destroyed five years after completion of the study. You will receive $20 reimbursement for your participation in this component of the study.

If you have any questions or concerns about your participation in this study, please contact Christine Marton, 416-699-0591 or marton@fis.utoronto.ca or Chun Wei Choo (supervisor) at choo@fis.utoronto.ca.

Please sign below if you agree with all of the following statements:

1. I have freely volunteered to participate in this interview.
2. I have agreed to permit audiotaping of this interview.
3. I have been informed in advance about the nature of the study, what my tasks would be and what procedures will be followed.
4. I have been given the opportunity to ask questions and have had my questions answered to my satisfaction.
5. I understand that the information that I provide will be treated confidentially and that my identity will not be revealed in the reporting of the study results.
6. I am aware that I have the right to withdraw my consent and discontinue participation at any time.

Participant’s First and Last Name (please print)  First and Last Name (please sign)

Christine Marton, researcher  ____________________________  Date
Understanding how women seek health information on the Web

Participant Consent Form for Collection of Web Activity Files

for Participants with Sole Use of Computer/Internet in the Home

This collection of Web tracker log files and Web browser history and bookmark files is being conducted by Christine Marton, a doctoral student in the Faculty of Information Studies at the University of Toronto. The duration of monitoring of Web activity is 1 month.

Your written consent is required for this study. Your signature below implies consent to the installation of a Web tracker application on your home computer, and the collection of tracker log files and Netscape-generated bookmark and history files of your use of the Web to find health information, by the researcher for the purpose of data analysis of your patterns of Web use. Your name and the information you have provided for this study will be kept confidential. All data collected will be securely stored by the Researcher and will be destroyed five years after completion of the study. You will receive $10 reimbursement for your participation in this component of the study.

If you have any questions or concerns about your participation in this study, please contact Christine Marton, 416-699-0591 or marton@fis.utoronto.ca or Chun Wei Choo (supervisor) at choo@fis.utoronto.ca.

Please sign below if you agree with all of the following statements:

1. I have freely consented to the collection of Web activity log files and history and bookmark files of my use of the Web to find health information from my home computer.
2. I will initiate the tracker application when I am using the Web to find health information.
3. I have been informed in advance about the nature of the study, what my tasks would be and what procedures will be followed.
4. I have been given the opportunity to ask questions and have had my questions answered to my satisfaction.
5. I understand that the information that I provide will be treated confidentially and that my identity will not be revealed in the reporting of the study results.
6. I am aware that I have the right to withdraw my consent and discontinue participation at any time.

_____________________________  ____________________________
Participant’s First and Last Name (please print)  First and Last Name (please sign)

_____________________________  ______________
Christine Marton, researcher  Date

A webpage version of this consent form will be your default webpage on Netscape.
This collection of Web tracker log files and Web browser history and bookmark files is being conducted by Christine Marton, a doctoral student in the Faculty of Information Studies at the University of Toronto. The duration of monitoring of Web activity is 1 month.

Your written consent is required for this study. Your signature below implies consent to the installation of your and what procedures will be followed.

Reimbursement for your participation in this component of the study.

Please sign below if you agree with all of the following statements:

1. I have freely consented to the collection of Web activity log files and history and bookmark files of my use of the Web to find health information (but not the Web use of others living with me) from my home computer.
2. I will initiate the tracker application only when I am using the Web to find health information.
3. The tracker will not be active when others I live with are accessing the Web from home.
4. Web browser history and bookmark files will not be collected by the researcher.
5. I have been informed in advance about the nature of the study, what my tasks would be and what procedures will be followed.
6. I have been given the opportunity to ask questions and have had my questions answered to my satisfaction.
7. I understand that the information that I provide will be treated confidentially and that my identity will not be revealed in the reporting of the study results.
8. I am aware that I have the right to withdraw my consent and discontinue participation at any time.

Participant's First and Last Name (please print)    First and Last Name (please sign)

Christine Marton, researcher                           Date

A webpage version of this consent form will be your default webpage on Netscape.
Understanding how women seek health information on the Web

Participant Consent Form for Journal of Web Use

This collection of Web journal sheets detailing your use of the Web is being conducted by Christine Marton, a doctoral student in the Faculty of Information Studies at the University of Toronto. The duration of journal entries is 1 month.

Your written consent is required for this study. Your signature below implies consent to keep a journal of your Web use and complete journal sheets each time you are using the Web to find health information, and for the collection of your journal sheets by the researcher at the end of the study for the purpose of data analysis of Web usage patterns. Your name and the information you have provided for this study will be kept confidential. All data collected will be securely stored by the Researcher and will be destroyed five years after completion of the study. You will receive $10 reimbursement for your participation in this component of the study.

If you have any questions or concerns about your participation in this study, please contact Christine Marton, 416-699-0591 or marton@fis.utoronto.ca or Chun Wei Choo (supervisor) at choo@fis.utoronto.ca.

Please sign below if you agree with all of the following statements:

1. I have freely consented to keep a journal of my use of the Web to find health information and to the collection of my journal sheets by the researcher at the end of the study.
2. I have been informed in advance about the nature of the study, what my tasks would be and what procedures will be followed.
3. I have been given the opportunity to ask questions and have had my questions answered to my satisfaction.
4. I understand that the information that I provide will be treated confidentially and that my identity will not be revealed in the reporting of the study results.
5. I am aware that I have the right to withdraw my consent and discontinue participation at any time.

Participant’s First and Last Name (please print)  First and Last Name (please sign)

____________________________________  ___________________
Christine Marton, researcher

____________________________________  ___________________
Date
Appendix C: Profile of study participants with mental health conditions

Part1 is a middle-aged Caucasian woman of partial German parentage. She is a nurse and her primary health condition is anorexia. She also has osteopenia (bone loss) due to anorexia. She is primarily concerned with good nutrition and eating enough to gain weight as well as avoiding over-exercising, one of the symptoms of her condition. She characterizes her current health status as the “fragile recovery stage”. She is interested in holistic medicine as well as conventional medical treatment. Dealing with her family’s reactions to her eating disorder is difficult, especially during the holidays, because while they urge her to talk openly about it, in practice, they avoid any discussion. She is the family caregiver and her extensive caregiving experience primarily entails acting as a trusted source of health information for her mother, a former public librarian, and for one of her two sisters, who is permanently physically and cognitive disabled from a serious accident while working overseas. She views informational sites and reads articles on coping with anorexia, and subscribes to anorexia support lists, which she finds helpful, both as a source of information and to help her cope during difficult moments. She also frequently finds health information on the Web for her mother and her incapacitated sister at their request.

Part2 is a young woman, possibly of southeastern European ethnicity, who majored in psychology. She became severely depressed while living in residence, and was traumatized by an involuntary psychiatric admission initiated by a healthcare professional who mistakenly thought she was suicidal. At present, she lives with her family and is employed as a research assistant by a psychology professor. She has some family caregiving experience pertaining to her father’s hip surgery and her sister’s experience with shyness and depression. As seems frequently to be the case with young
women, she has provided informal counseling and support to friends and roommates. Although she has tried many types of antidepressants, and is currently on an extensive regimen of mainstream antidepressant medications, her depression has not been alleviated. Furthermore, she frequently experiences difficulty sleeping (insomnia) and has debilitating migraine headaches. She has had suicidal episodes which were later identified as a side effect of one of the medications. She has also gained weight, which she attributes to lack of energy to exercise and to sugar cravings, a side effect of Prozac.

Before the onset of her condition, she had been very physically active. At present, she is satisfied with her relationship with her current mental health professionals – a medication psychiatrist, a psychotherapist, and a psychiatrist with a background in social work, whose advice on coping with side effects she has found to be helpful. However, she feels that the help they provide is of limited use, as her prescription pharmaceutical medication does not seem to be effective. She describes her depression as atypical and treatment-resistant; as “chronic depression over laden with episodes of dysthymia”; so-called Double D. Her mother is the primary family caregiver and also a source of information on non-traditional or natural health practices. She has good relationships with all members of her immediate family. At home, she uses her father’s computer and Internet access. However, this computer belongs to her father’s employer and its settings prevent her from subscribing to CMC channels, which she finds restrictive and frustrating.

Part 3 is a young woman of eastern European ethnicity who is studying undergraduate psychology. She has atypical anorexia; she has been told that she is not eating enough, but she does not deliberately starve herself. Her mother is a pharmacist and she is comfortable confiding in her mother and obtaining health information and advice from her. At present, she is receiving care for depression, and is taking Effexor. However, she
does not have a good rapport with her mental health professional and has difficulty taking seriously her professional advice. She has been told that she should get treatment for her eating disorder but has not done so. She eats one meal a day, usually at mid-day. Recently, she learned about the neuropsychological basis of anorexia from a psychology course, and she trusts the professor’s expertise in this area. She is also concerned about a recently discovered breast lump, and her predisposition to skin cancer, which worries her somewhat given that she is considering the use of tanning beds. She is Web savvy and has designed her own personal website. She relies heavily on finding health information through Google keyword searching.

Part4 is a young Chinese-Canadian woman who is studying social work. She began experiencing her mood disorder, later diagnosed as bipolar disorder, when she was in residence for her undergraduate studies. There, she was also traumatized by her roommate’s suicide attempt and caring for her roommate, who lacked family support and unappreciative of her efforts. She has a difficult relationship with her mother, who is a physician; although she readily admits that it was her mother who found her the best mental health professionals once she was aware of her daughter’s mental health problems. She also feels conflicted over her dual racial identity as a Chinese-Canadian; she is torn between her culture’s values which predominate at home, and that of Western society, as manifested in popular culture and her academic life. She has regularly scheduled visits with two mental health professionals – a psychiatrist specializing in medication, and a psychiatrist specializing in cognitive therapy. She is satisfied with the care she is currently receiving from them, which may explain why she does not seek health information online pertaining to her mental health condition. Although she does not have family caregiving experience, she is a source of support and health information for a male friend who has irritable bowel syndrome, which restricts his
social life considerably. She seeks health information online for her male friend, not because he asked her to do so, but because she wants to help him and gain an understanding of what he has been going through. She also visits health websites authored by health and social service agencies associated with her social work studies, and has a preference for sites that provide information on Chinese culture and mental illness.

Part5 is a young Taiwanese visa student studying in Canada. She is overweight and occasionally depressed; her experience with depression seems to be seasonal in nature. She tried Xenical for weight loss but was warned about its side effects. She is sincerely interested in Traditional Chinese Medicine (TCM), and has received treatment from a local TCM practitioner, including herbal treatment and acupuncture. She believes that TCM is more natural and therefore better for her than Western medicine. She also exercises, with a focus on Tae Kwon Do, a Korean martial art, but readily admits that motivation to exercise is sometimes lacking. She lives with a female roommate with whom she shares a computer and Internet access. Her Web use, for health information seeking and other purposes, is largely restricted to Taiwanese websites because she is not fluent in English. Her family caregiving experience is limited to occasionally caring for her invalid grandmother in Taiwan.
Appendix D: Ethics approval documents (scanned)

TO BE COMPLETED BY THE FIS HUMAN SUBJECTS REVIEW COMMITTEE

I have examined the application form and attachments and judge that the applicant has met the required FIS standards for the conduct of social research.

Committee Members (minimum of 2)

Name: [Signature] Date: Aug 11, 2020

APPROVED: Yes [ ] No [ ] (see checklist below) Conditional [ ] (see checklist below)

Name: [Signature] Date: [ ]

APPROVED: Yes [ ] No [ ] (see checklist below) Conditional [ ] (see checklist below)

CHECKLIST of reasons for lack of approval (check as many as apply):

- Subjects should be fully informed about the nature and purpose of the research (or adequate reasons should be given for not informing the subjects)
- Procedures for obtaining consent should be described
- Participants should be informed of any risk to them
- Where risk exists, sufficient steps should be planned and undertaken to minimize the risk
- The voluntary nature of participation should be indicated
- Subjects should be told that they can withdraw from the research at any time without penalty
- Anonymity of the participants should be explained and procedures to protect anonymity are described or reasons for lack of anonymity are given
- Confidentiality of the data should be explained and procedures described
- Other (please describe)

Protocols that, in the opinion of one or more committee members, do not meet these standards are returned unsigned to the applicant with an indication of revisions required. In cases where research instruments are not yet fully developed, applicants may receive conditional approval pending receipt of the completed research instruments.

cc: Student File (original), Student
University Health Network Research Ethics Board
200 Elizabeth Street
CCRW 2-813/814
Toronto, ON M5G 2C4

To Whom It May Concern:

This is to inform you that the design of Christine Marton's Ph.D. dissertation project
"Understanding How Women Seek Health Information on the World Wide Web" received
approval from the University of Toronto, Faculty of Information Studies Standing Committee on
the Use of Human Subjects.

Sincerely yours,

Clare Beghtol
Chair
Committee on the Use of Human Subjects
Associate Professor
University of Toronto
Faculty of Information Studies
140 St. George St.
Toronto, ON M5S 3G6

voice: (416) 978-8852
fax: (416) 971-1399
beghtol@fis.utoronto.ca
February 20, 2001

UHN # 01-0126-E

Ms. Christine Marton  
Women's Health Program  
Toronto General Hospital  
ML-2-002

Dear Ms. Marton:

The protocol entitled "Understanding How Women Seek Health Information on the Web" and the consent forms have been reviewed by the University Health Network Research Ethics Board. The proposal is approved from an ethical standpoint for the next 12 months.

If, during the course of the research, there are any serious adverse events, substantial changes in the approved protocol or any new information or developments which must be considered with respect to the study, these should be brought to the attention of the Board.

Yours sincerely,

[Signature]

Ronald Heslegrave, Ph.D.  
Chair, University Health Network Research Ethics Board

RH/bh

20 January, 2001  
Date of Approval

20 January, 2002  
Expiry Date of Approval
Appendix E: Study Publicity

Letter size study poster, November 2000 - next page
Study on women using the Web to find health information

Who can participate?
Women of all ages, backgrounds, nationalities and health experiences are invited to participate in this study. I am interested in your honest opinions about your use of the Web to find health information. I am also interested in how you obtain health information from other information sources, such as health care practitioners, print publications, videos and television.

Compensation
Participants who complete all components of the study receive $50. Those who complete the online questionnaire are eligible for a draw of $100.

Who is conducting the research?
Christine Marton is a fourth year doctoral student in the Faculty of Information Studies at the University of Toronto. She has a background in human biology and information science.

Contact Information
For more information, visit the study website at http://www.fis.utoronto.ca/phd/marton/WomensHealth/ or contact Christine Marton by email at marton@fis.utoronto.ca

This study is funded by a doctoral fellowship from the Medical Library Association and the Institute for Scientific Information.
Appendix E: Study Publicity

Screen capture of advertisement in Planned Parenthood online newsletter, InfoSexNet, December 2000 edition

(13) PARTICIPATE IN STUDY ON HOW WOMEN LOOK FOR HEALTH INFORMATION ON THE WEB

If you are a woman who uses the Web, you are invited to participate in this study on how women look for health information on the World Wide Web. Christine Marton, a fourth-year doctoral student in the Faculty of Information Studies at the University of Toronto, is conducting the study. If you are interested in participating, please visit the study Web site at

http://www.fis.utoronto.ca/phd/marton/WomensHealth/, or contact her at marton@fis.utoronto.ca

* * * back to the top * * *