

**A Comparative Analysis of Internet Health Information Use between
Canadian Baby Boomers and Older Adults**

by

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Abstract

This thesis will compare age differences of Internet use and Internet health information use between Canadian baby boomers and older adults. Specifically, it will examine current patterns relating to Internet use for the purpose of accessing health information, comparing baby boom aged persons with those in older age groups. Using the 2005 Canadian Internet Use Survey and the 2000 General Social Survey, patterns related to Internet use and Internet health information use will be explored, including: access, frequency, location, types of health searches performed and health sites visited, barriers to Internet use, privacy concerns about using the Internet, and a selection of demographic and socio-economic factors. Significantly higher rates of Internet use and accessing health information on the Internet were found for the baby boomers compared to older adults. A number of different predictors were uncovered for the various age group comparisons. Theoretical implications and policy recommendations are also discussed.

Keywords: baby boomers; older adults; Internet; health information; e-health; Canada

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Chapter One: Introduction

The baby boomer generation, defined as persons born between 1946 and 1965, has drawn the attention of health researchers and policy makers over the last decade. The front edge of this generation will reach their 65th birthday in 2011. By 2021 the number of people aged 65 and over will represent approximately 18% of the population in Canada and by 2031, the baby boomers will be 65 and over with a range in age between 66 and 85 (Health Canada, 2002). The baby boomer generation is often viewed as being a burden on the future health care system, as they rapidly approach the age of 65; since this is the age of onset of disability and illness for many people. However, a decline in health and function is not inevitable for people in their mid-life stage. Using health promotion strategies targeting the modifiable risk factors for baby boomers at their current stage in life has the potential to produce favourable long term health outcomes that could contribute to a healthy aging experience for the baby boomers as they make the transition to older adulthood (Puska, 2005; Wister, 2005). This study will focus on an emerging sub-field in the research literature: description and examination of predictors of Internet use for the purpose of obtaining health information among baby boomers. Given the rise in Internet use, this area of health promotion has drawn the attention of researchers. By examining patterns of Internet use for health information we can begin to understand how it is currently being used and how the Internet could be even more beneficial for health purposes in the future, such as providing people with the type of information that could improve their health knowledge, and ultimately improve health outcomes.

Significance of Study

The Internet as an information medium has become increasingly popular over the last decade. Many people have access to it, and if they don't, they may know where they could obtain access. The Internet has changed the way that we are able to communicate, seek information, and perform everyday tasks. In many ways, it has simplified our lives, and in other ways it has contributed to socioeconomic inequalities. Since owning a computer and accessing the Internet can be expensive, not everyone is able to benefit from its potential. This means that not everyone is able to access health information, which may put these people at a disadvantage for developing health knowledge. Age differences are expected to be prevalent when it comes to Internet use and should be specifically examined, especially since the health information needs increases with age.

Given the magnitude of this generation and the stage of life they are in, the baby boomers will continue to play a key role in many economic, social and health realms of society, making them a priority for health promotion strategies. With an increasingly older population, concerns have been raised as to whether the health care system is financially sustainable. These concerns are reasonable, considering that in 2003 health care costs in Canada totalled approximately \$110 billion (CIHR, 2005). Although we cannot know for sure what the future health care scenario in Canada will look like, we can begin to understand and predict how this aging generation will influence society in general, and the health care system in particular, which will help us be more prepared for the future.

As a cohort, the baby boomers are known for being techno-savvy and interested in new ways to achieve their health goals that will not only accommodate their busy

lifestyles, but also help them maintain their independence (Gilbert, 2000). This makes them a prime target for online health information and other e-health tools. Since they are at a stage in their lives when disability and illness begins to appear, targeting modifiable risk factors for change and promoting health education at this point in their life course could facilitate lifestyle changes that may have long term health benefits.

This study will help determine the extent to which Canadian baby boomers (compared to those 65 and older) have access to and actually use the Internet in general and for medical or health-related information. It will also identify the specific characteristics and barriers that influence baby boomers and older adults to use the Internet in general and for medical or health-related information. The information gained from this study will help determine the type of health information that users find helpful, where they are finding this information and what might be preventing certain user groups from accessing online health information. Once these patterns and barriers are addressed, a set of recommendations will be presented in order to help organizations maximize the potential of the Internet for health education and health promotion purposes.

Background for Study

Internet and health are two words that have been used together more frequently over the last decade; often referred to as 'e-health'. According to Health Canada, e-health is "an overarching term used today to describe the application of information and communications technologies in the health sector" (Health Canada, 2006). E-health can include broad types of health technology, such as telehealth and electronic health records, however it also encompasses health information on the Internet; the main focus of the current study.

The baby boomers have been exposed to the growth and widespread use of Internet technology. Estimates on Internet use for health purposes have been varied due to selection and nonresponse bias, making it difficult to get an accurate reading of the magnitude of its use (Baker et al., 2003). In an American survey on Internet use of older Americans it was found that 70% of people aged 50-64 had ever gone online, while 64% had access to the Internet at home (Kaiser Family Foundation, 2005). If these reports are accurate, this is a significant proportion of people who have access to or have at least used the Internet at one point, and it is expected that the numbers would be at least this high among Canadian baby boomers. Canadian studies in this area have been limited to date.

According to Clark (1998), baby boomers are more concerned about healthy lifestyles and healthy aging, are more interested in self-help resources such as the Internet, and are more demanding of good service compared to previous cohorts. Blanchette and Valcour (1998) state that “Boomers present the potential to redefine aging. They may become the healthiest, most productive and most innovative group of older people that the world has ever seen” (p.80). If baby boomers are going to change the way that aging is experienced, then we also have to change the way we think about health and aging. This necessitates the understanding that investing into one’s health before one reaches older ages can have a significant influence on patterns of health and well-being later in life. This could be important in predicting whether one engages in health-seeking behaviour, such as using the Internet for health purposes.

Although the Internet has been used more for health care purposes in recent years, the focus is rarely geared towards older adults. The Internet is a powerful health

promotion tool given the increasing level of access to individuals and the vast amount of health information that is currently available online. It is predicted that this technology has the potential to influence population health (Baker et al., 2003), and more specifically, to benefit the health of baby boomers and older adults.

By making health information more accessible, it could change the way that people use health care (Baker et al., 2003). For example, it could result in people being more knowledgeable about their health issues and the care that they are receiving, such as asking appropriate questions or communicating more effectively with their physician. It could also prompt individuals to seek timely care that could affect illness outcomes or allow people to manage their own care and avoid expensive medical treatment (Baker et al., 2003).

There are many concerns that need to be addressed when it comes to the Internet and health that should not be overlooked. For example, consumers of health information need to know where to go to access accurate health information and how to be selective in the information they find. Self-diagnosis, improper medication use or delaying professional treatment are all risks of providing unsupervised health information. There is also the risk of information overload resulting in a person being more confused about their health concerns. However, overall, it is thought that the benefits of using the Internet for health information such as improved health knowledge and communication of health concerns outweigh the negative outcomes that may occur in some instances.

Health care services should be dynamic in order to meet the needs of the heterogeneous aging population. By examining online health information-seeking patterns of the baby boomers, our understanding of the way health information and

services are distributed and accessed can be expanded. In addition, identifying predictors of use, including facilitators and barriers, will add to our knowledge base. Innovative health care for the baby boomers is within reach.

Objectives

The objectives of this study are to:

- Describe characteristics associated with Internet use and Internet use for health information among baby boomers (i.e. sex, socioeconomic status, etc.) compared to older adults.
- Identify current online health information-seeking behaviours of baby boomers (frequency, internet access location, type of information searched for, etc.) and their association with various characteristics of baby boomers (sex, socioeconomic status) compared to older adults.
- Specify types of websites commonly used by baby boomers for online health information (Health Canada, other government sites, professional health associations, non-profit, commercial sites, universities, etc.) compared to older adults.
- Describe the factors associated with perceived usefulness of online health information (i.e. sex, education, income, etc.).
- Examine the implications of the findings and report practical recommendations on how to maximize the potential of the Internet as a health education and health promotion tool in order to improve the health of the baby boomers.
- Outline the most common barriers to accessing the Internet and develop a set of practical recommendations to remove these barriers.
- Produce a comprehensive research document (thesis) on Internet use for health information focusing specifically on Canadian baby boomers.

Chapter Two: Theoretical Rationale

Self-Care

Self-care is one of the central themes of this thesis, since searching for online health information is in and of itself, a form of self-care. Self-care is more than just changing particular health behaviours; it involves being motivated to seek out health information or advice and being knowledgeable about various health issues (Chou & Wister, 2005). Self-care is not a new health concept. In fact, it became widely known in the seventies during the time of the wellness movement, when people were moving away from the medicalized view of health and learning that they could be active agents in their own health (Kickbusch, 1989). There was a new recognition that health maintenance involves structural, social and behavioural constructs, and not strictly medical care (Dean & Kickbusch, 1995). The notion of self-care has presented some controversy over the years because of the policy questions that arise, where some argue that it is just an excuse to 'blame the victim' in an attempt to cut important health care services and put the responsibility of health on individuals and families (Kickbusch, 1989; Dean & Kickbusch, 1995). Further research reveals that there is much more to self-care than this one-sided view. Self-care in health promotion refers to the actions that people carry out in their everyday lives in order to improve their health and wellbeing (Kickbusch, 1989). This can include avoiding risk factors, changing unhealthy behaviours and an overall adoption of a healthy lifestyle. As Dean and Kickbusch (1995) explain, "Inherent in the concept is the recognition that whatever factors and processes may determine behaviour,

and whether or not self-care is effective and interfaces appropriately with professional care, it is the individual person that acts (or does not act) to preserve health or respond to symptoms” (p.36). It appears that disease management is costing the health care system more than if we invested additional resources in health education and health promotion efforts. There needs to be a balance between self-care and professional care in the health promotion field and the two should not be mutually exclusive (Dean & Kickbusch, 1995). Clearly, not everyone practices effective self-care. The life-course framework helps explain how health-seeking behaviours (i.e. searching for online health information) and health outcomes are influenced by a variety of factors occurring over the course of one’s life.

Life Course Framework

The life course framework relates to three main predictors of health outcomes: 1) the role of earlier life experiences; 2) cohort effects; and 3) human agency. By looking across the life course, advantages and disadvantages that have occurred among subgroups can be examined to assess the effects of past experiences (Kahn & Fazio, 2005). For example, having social and economic advantages early in life can help in creating a positive environment where a person feels safe, can access health care, and is able to pursue an education that may lead to wealth and further advantages over the life course. These experiences over the life course can also affect health literacy levels, or whether a person is knowledgeable about their health. Thus, a person’s health later in life is partly a result of earlier life experiences (O’Rand, 1996). This framework relates to the main research question about characteristics associated with searching for online health information. The value that a person places on their health is reflected in their health-

seeking behaviours. Health-seeking behaviours such as acquiring knowledge about one's health, seeking medical advice or adhering to a program or treatment affect health outcomes, and are the result of earlier life experiences and decisions. Thus, using the Internet for health information (a health-seeking behaviour) is influenced by a number of socioeconomic, demographic and personal factors including but not limited to: age, education, income, whether a person lives in an urban or rural setting, whether or not they are married, their health status, and whether they have access to the Internet.

Drawing on assumptions of the life course framework, the cumulative disadvantage hypothesis proposes that advantages and disadvantages over the life course tend to accumulate over time and contribute to inequalities experienced later in life (Quadagno, 2005). According to this approach, interindividual divergence occurs over time in the case of various characteristics and resources (i.e. income, education) (Dannefer, 2003), which contributes to differences observed between individuals within a cohort. For example, the baby boomers comprise a cohort that is known for being more educated than previous cohorts, however those who did not receive an education may be at a disadvantage compared to their educated counterparts. This interindividual divergence in socioeconomic status can contribute to health disparities observed within a cohort.

Differences in health status within a cohort do not appear suddenly in old age; instead health should be observed as an evolving process beginning early in life and continuing throughout the course of one's life (Kahn & Fazio, 2005). As people reach their 50s, the relationship between socioeconomic status and health status becomes even stronger (Quadagno, 2005). This can lead to negative health outcomes for a person who

has faced social and economic disparities throughout their life. For example, if a person's health begins to deteriorate in mid-life, this may cause financial problems contributing to a perpetual downward spiral of economic hardship and poor health (Kahn & Fazio, 2005). O'Rand and Hamil-Luker (2005) find that beginning in childhood, economic hardship can accumulate and lead to an increased risk of developing heart disease. The processes by which these disparities occur remain unclear; what is clear is that socioeconomic disadvantages can contribute to negative health outcomes, especially later on in life (Kahn & Fazio, 2005).

Socioeconomic factors such as income, education and occupation affect health literacy levels and access to health information via the Internet, resulting in lack of knowledge on various health issues, and thus affect health-seeking behaviours. The 1986 American's Changing Lives (ACL) study focused on socioeconomic disparities and how health changes with age in middle and later life. From this study, House, Lantz and Herd (2005) found that socioeconomic factors, including education and income, were the strongest predictors of health and that these disparities increased over the life course, specifically between early adulthood and old age. Education and income are important determinants of health because they relate to a multitude of factors that can affect a person's health, such as access to and use of health care services, health behaviours, social relationships, social support, stress, roles and psychological states (House, 2001). Part of the socioeconomic differential is due to health knowledge and health promotion. By addressing health education and health promotion strategies via the Internet early on, it has the potential to improve overall health by reducing risk factors that could be predisposing people to poor health.

The life course theory is also connected to the concept of human agency, which is the ability of humans to exert control over their thought processes, motivation and action (Bandura, 1989). This can include a person's motivation to seek health knowledge or their actions to actually carry out or change a particular health behaviour. Earlier life experiences contribute these thoughts, motivations and actions. For example, a person who had social support, opportunities to succeed in life and develop confidence may be more committed and determined to reach their goals later on than a person who did not have the same opportunities and support (House, 2001; Bandura, 1989). Similarly, a person who experienced an accumulation of disadvantages over time may set lower goals and be less committed to attaining them because they lack the confidence required to affect change. Consequently, past experiences can either limit or encourage behaviour change.

By focusing on the health needs of the baby boomers before they reach old age, helping them make healthy choices, there is a higher likelihood that they will have a healthy aging experience. This corresponds with the compression of morbidity hypothesis proposed by Fries (2001). Interventions that focus on reducing risk factors and promoting health among middle and older aged adults can help postpone chronic illness and disability until later in life and compress the length of time that a person may suffer from such ailments. This can be facilitated through health education and health promotion approaches that give people the opportunity to take control of their own health, teaching them how to put information into practice in order to change behaviour.

Social Learning Theory and Self-Efficacy

Based on the social learning theory, a person's motivation to change a behaviour can be predicted by their self-efficacy, or the confidence they have to carry out a particular action (i.e. managing an illness, quitting smoking, starting an exercise regime) (Bandura, 1977; Bandura, 1989). A person is more likely to adopt a particular behaviour if they feel that they can undertake it successfully and if they have the support to do so. Human agency is also central to this concept and is connected to the idea of self-efficacy. A person with strong self-efficacy will set higher goals, have a higher level of commitment and will expect more favourable outcomes (Bandura, 1989, 2002).

Using the Internet for health information requires self-efficacy and motivation due to the self-directed nature of the Internet. Bandura (2002) believes that information technologies are a tool and that people who use them must be able to motivate themselves to take advantage of these types of systems and develop skills that will help self-regulate their learning in order to succeed. However, the avalanche of information available on the Internet makes people vulnerable to information overload and can lead to self-doubt. People who have low efficacy for self-directed learning will therefore not accomplish as much as their motivated and self-directed counterparts (Bandura, 2002). While this thesis will not be directly testing this association, it helps to understand motivation for health behaviours. Clearly, motivation for self-directed learning and health behaviour change requires self-efficacy, but there are other factors that play important roles as well.

Health Information as a Cue to Action

Related to health motivation and factors influencing a person to take action is the Health Belief Model proposed by Rosenstock (1974). According to this model, health

behaviours are influenced by a combination of perceived susceptibility to the health problem, perceived seriousness of the health outcome, as well as the benefits and barriers of changing one's behaviour. These beliefs in turn, are influenced by cues to action in the environment. Cues to action can trigger particular actions and can lead to positive health behaviours; unfortunately this is often inhibited by low self-efficacy (Rosenstock, 1974). Health information can act as a powerful cue to action (Chou & Wister, 2005). For example, becoming more aware of a particular disease or risk factor may motivate a person to take preventive action (Rimal, 2001) because according to the Health Belief Model, it might change how that person perceives their susceptibility and the seriousness of the disease (Rosenstock, 1974). Given the volume of information available and the ability to search for topics of interest online, the Internet can provide numerous cues to action that could lead to behaviour change. In addition, online health information has the potential to reach a large audience while at the same time it can be tailored to specific populations. If cues to action are able to target subgroups, the likelihood of behaviour change will be increased because the cues will be more relevant to that particular group. For example, since the baby boomers were part of a youth culture earlier in life, they are known for valuing youthfulness and may be motivated by health promotion techniques that slow the aging process or that make them feel younger and healthier (Wister, 2005). Thus, health information websites need to take into consideration the types of searches and information that various subgroups of baby boomers are going to be interested in, and cater to these needs (i.e. osteoporosis prevention, balancing a career and exercise, etc.). The higher levels of education among baby boomers may also make them more receptive to certain types of health promotion messages and less willing to accept advice

at face value (Clark, 1998). It may also affect the type of websites that baby boomers are drawn to (i.e. government-sponsored sites vs. commercial sites). In the same light, it is also important to consider the barriers that might discourage a person to seek health information on the Internet in the first place, such as cost, access, or lack of skills. Without incorporating these into the overall strategy of using the Internet as a health promotion tool, health information as a cue to action becomes irrelevant. Therefore, we need to examine both barriers and predictors of different types of Internet use for health education and health promotion purposes.

Summary of Theoretical Perspectives

For people to take control of their health in the form of increasing health knowledge or changing behaviours, they must be motivated to practice effective self-care. Whether they choose to do so depends on personal factors (i.e. self-efficacy), social factors (i.e. cohort effects), and environmental factors (i.e. cues to action) (Chou & Wister, 2005; Dean & Kickbusch, 1989; O'Rand, 1996; Bandura, 1977, Bandura, 1989). The earlier a person decides to be an agent of their own health, the better their health outcomes will be, since they will have had a longer time to learn and practice self-care behaviours and ultimately reduce risk factors for poor health (Bandura, 1989). This requires the understanding that health can be improved at any stage of life. People at the mid-life stage are no exception, especially since health issues become more prominent later in life. The Internet can provide information that makes a person think more about their health, become more knowledgeable about their health and take better care of their health. It is thought that universal access to relevant and appropriate health information

on the Internet can have a positive affect on people's health, despite past experiences, beliefs, and health status.

Chapter Three: Overarching Research Questions

By comparing the baby boomers with current older cohorts (defined in this study as those people aged 55-64 and 65 and older), the data gained from the research questions can be used to elucidate future patterns of health behaviour. Specifically, it will give an idea about future patterns in Internet health information use among the baby boomers once they reach older ages. This thesis will examine age differences at one point in time, which will provide a starting point for further examination of the use of the Internet for health education and health promotion purposes in Canada.

It is understood that this will be a crude comparison because the data is cross-sectional and will be prone to the complexity of age patterns over time- age, period and cohort. The particular age range of a cohort relates to age effects; the shared social experiences of a particular age group are cohort effects; and the historical events experienced by a cohort are period effects (Wister, 2005). It is important to note then, that this is not a cohort study; instead, we will be examining age differences within each cross-sectional data set (at one point in time) in order to make predictions and recommendations for the future. A cohort analysis should use several cross-sectional surveys or panel data, neither of which were available. Although there are some inherent limitations of using secondary data (i.e. must work with information that is available), it allowed for a larger sample size than would have been possible with primary data, while still being able to focus on the main research questions that have not been examined extensively in the literature.

Internet Access and Use Patterns

Before we examine Internet use for health information we must first establish patterns regarding general access to the Internet. If people do not have access to the Internet or are not currently going online, examining Internet use for health information will be irrelevant. Therefore, the first set of research questions remain at the descriptive level and include current Canadian use, types and general levels of access to the Internet among baby boomers, and their associations with various demographic and socioeconomic characteristics (age, sex, socioeconomic status, marital status, and region) compared to older cohorts.

Ethnic minorities, people with low income and education, and the elderly have the highest incidence of disease (Cain et al., 2000). Individuals with the highest risk for poor health also tend not to have access to the Internet (US Department of Health and Human Services, 2006). For example, while 33% of seniors (65 and older) have Internet access in the US, only 15% of seniors with incomes under \$20,000 do so (Kaiser Family Foundation, 2005). This is referred to as a “digital divide” (Cain et al., 2000; US Department of Health and Human Services, 2006). There are many ways in which this divide can be reduced; however it first requires an understanding of and appreciation for the characteristics and needs of the intended users of online health information. More research is also needed to understand how to reach these people, as well as how to motivate, engage and ultimately support them in using the Internet as a health promotion tool.

By examining user patterns, it will facilitate the identification of those not using the Internet and compare characteristics of users and non-users. These patterns will also

help us compare Internet access and use of the baby boomer cohorts to older adults.

Applying these data will assist in developing practical solutions to increasing access and use of the Internet.

Specific Research Questions:

- *Who has ever used the Internet?*
- *Who has used the Internet for the longest period of time (i.e. over 5 years)*
- *Who has access to a computer from any location (home, work, school, other)?*
- *Who used the Internet from home/work?*
- *How often are people using the Internet from home/work (i.e. in a typical month)?*
- *How does access and use differ between the baby boomers and older adults?*

Internet Health Information Use Patterns

Once patterns on access and use are identified, we will turn to the main purpose of the study relating specifically to explaining patterns in Internet use for health information. Therefore, the second set of research questions are at the explanatory level, including various demographic and socioeconomic characteristics (age, sex, marital status, region, education and income) and their association with having searched for online health information, compared to older cohorts. We will also be able to examine the frequency of health-related searches, the types of site visited, and how useful this information was perceived to be. By examining these patterns we can begin to better understand future health-related Internet use, and from a policy perspective, expose any gaps that may exist in an attempt to improve the way that online health information is distributed and accessed.

As the baby boomers reach the age of 65 in 2011 and beyond, they will likely require more health information due to health needs. In the United States, there are approximately 23.6 million people who search for health information online and it is estimated that a majority of these are baby boomers (Cain et al., 2000). Approximately 24% of health information gathered is from an Internet source, and the Internet has even surpassed television, magazines, books and newspapers in the United States as a source for health information (Kaiser Family Foundation, 2005). Therefore, uncovering predictors of Internet use for health information, types of use, and differences across age groups is important.

Specific Research Questions:

- *What are the characteristics of baby boomers that are searching for online health information? (i.e. socio-demographic characteristics)*
- *How is health status associated with searching for online health information?*
- *How often do baby boomers search for online health information in a month?*
- *What kind of medical/health information do baby boomers search for? (Alternative therapy, health care delivery, symptoms, specific diseases, medication, etc.)*
- *What types of Internet sites are baby boomers visiting for health information? (Health Canada, other government sites, professional health associations, non-profit, commercial sites, universities, etc.)*
- *How useful do baby boomers find online health information to be?*
- *How do online health information-seeking patterns differ between the baby boomers and older adults?*

Barriers to Internet Access and Use

By examining barriers to Internet access, these data will help determine impediments that baby boomers are experiencing in accessing the Internet, and will assist in establishing recommendations to overcome these issues and increase use. These recommendations could, in turn, be integrated into health-related Internet sites in order to increase usership.

When it comes to using the Internet, people are often hesitant to offer personal information or take what they read at face value because of security concerns. However, according to the Kaiser Family Foundation (2005), baby boomers tend to put more trust in the Internet for health information than older adults. This could have potentially negative consequences. If people are not selective in the information that they find, it could lead to extensive self-diagnosing, self-medicating, and people looking for quick fixes that could delay serious diagnoses and treatments (Bandura, 2002). If the patterns are similar in Canada, this suggests that the baby boomers need to be educated on how to critically evaluate online health information for accuracy and reliability so that they are not harmed by being overly trusting.

Health literacy is another underlying barrier to using the Internet for health information. Although health literacy will not be exclusively examined in this study, it is an important issue to discuss because it can act as a barrier to health information. Health literacy refers to the capacity of individuals to get health information and use it to make appropriate decisions regarding their health (US Department of Health and Human Services, 2006). Health literacy is important because of its influence on a person's interpretation of health messages, their communication of health problems, their ability to

participate in interventions, and the skills required to use the Internet to find health information. Health literacy depends on a number of factors including one's socioeconomic status (i.e. education), experience (i.e. health history), and culture (i.e. language). A study conducted by Birru and colleagues found that most online health educational materials require at least a 10th grade reading understanding (Birru et al., 2004). If understanding of health material is limited, the individual may not correctly identify disease symptoms, or they may not follow medical or health promoting prescriptions properly. In fact, low-literacy adults are twice as likely to be hospitalized as people with high functional literacy (Birru et al., 2004). Low health literacy is also associated with higher rates of cancer, mortality and lower quality of life (Friedman et al., 2006).

The health literacy problem appears to exist in Canada as well. According to the International Adult Literacy Survey (IALS), the average reading level of Canadian adults is grade 8 or 9 (Friedman et al., 2006). Furthermore, adults over the age of 55 account for 50% of Canadians with literacy problems, and over half of the people over 65 have the lowest scores on reading (Friedman et al., 2006). In addition, almost 90 percent of adults over the age of 65 had health literacy scores below the level considered adequate (Canadian Council on Learning, 2007). Although the baby boomers in general are known as being highly educated compared to their parents generation, this is not the case for everyone and therefore health literacy as it relates to using the Internet needs to be addressed.

Specific Research Questions:

- *What are the most common barriers among baby boomers to using the Internet?
(Cost, access, lack of skills, not enough time, no need, etc.)*
- *Who should take the greatest responsibility to ensure barriers are removed?
(Government, agencies, private industries, etc.)*
- *Do baby boomers have concerns about privacy when using the Internet?*
- *How do the barriers and privacy concerns differ between the baby boomers and older cohorts?*

Chapter Four: Specific Hypotheses

Internet Access and Use Patterns

There are limited studies on Internet access and use using Canadian data, therefore this study will aim to fill this gap. In contrast, there are several studies in the US that have covered this topic. For example, a report from the Kaiser Family Foundation (2005) in the US indicated that approximately 70% of 50 to 64 year olds had ever been online in 2005 compared to 31% of adults over the age of 65. Approximately 64% of those adults 50 to 64 had Internet access at home, compared to 33% of those over the age of 65. Owning a computer can be expensive, therefore older adults who are no longer working may not have the money to buy a computer compared to the baby boomers, many of whom are still in the work force. Also, many baby boomers have had to use the Internet as part of their jobs for many years; therefore they may be more likely to have access than older cohorts and use it more as a result.

Often times, people who do not have technological resources readily available are also people with the highest risk for poor health (U.S. Department of Health and Human Services, 2006). Ethnic minorities, people with low income and lower education levels have the highest incidence of disease yet they have also been associated with lower rates of Internet access (Cain et al., 2000; US Department of Health and Human Service, 2006). Socioeconomic status and health status are therefore expected to be associated with lower rates of Internet access and use. This disproportionate access to the Internet and other technologies that tends to occur among disadvantaged populations is referred to

as the “digital divide” (U.S. Department of Health and Human Services, 2006; Cain et al., 2000). This ‘digital divide’ is also expected to exist in Canada.

Hypotheses:

1. Baby boomers will be more likely than older adults to have ever used the Internet from any location for personal use and will be more likely to have access to a computer from any location.
2. Baby boomers will have used the Internet for a longer period of time than older cohorts.
3. Baby boomers will be more likely to have used the Internet from home and work in the last 12 months than older adults.
4. Frequency of Internet use from home and work for personal use in a typical month will be higher for the cohorts comprising the baby boomers than for older cohorts.
5. Socioeconomic status will be positively associated with having ever used the Internet and with having access to a computer from any location for all age groups.
6. Health status will be positively associated with having used the Internet in the last 12 months for all age groups.

Internet Health Information Use Patterns

As baby boomers age, they are using the Internet more frequently to find relevant health information. According to Gilbert (2000), each successive cohort appears to be more computer literate than the previous one, meaning that it is likely that the baby boomers are going to be more familiar with computer technology than older cohorts. Baby boomers are known for being knowledgeable about the Internet, since many use it regularly for both work and personal reasons. As a cohort, they are also known for being interested in healthy lifestyles and more conscious of the aging process than their parent’s generation. They also tend to be more open-minded and interested in ways to delay the

signs of aging. They may have learned about the importance of health by watching their parents age. Being a highly educated cohort compared to previous cohorts, the baby boomers are able to use their knowledge to their advantage, making them more likely to turn to the Internet for their health information needs. Thus, even though health information needs increase with age (since illness onset is age-related), it is expected that this is offset by a stronger inverse association related to technology access and knowledge, resulting in higher use than older age groups. Due to higher levels of education, it is also expected that baby boomers will find this information more useful because they will understand it more and use it more productively as a result.

Mid-life women in particular are prime targets for online health information. Baker et al. (2003) found that men were half as likely to search for online health information compared to women. Although the reasons why women search for health information cannot be tested in this study, we can attempt to explain the patterns that exist based on existing literature.

Women are known for being interested in their health, for using more health services and for being the decision-maker when it comes to health issues (Pandey et al., 2003). Women are also known for being nurturing and for their willingness to care for people around them. As a result, women in their mid-life years are often faced with multiple caregiving roles and have been referred to as the 'sandwich generation' (caring for both their children and their aging parents) (Chappell et al. 2003). Baby boomer women may also seek health information to help their aging parents, especially when they are the primary caregiver. They may also take on health concerns of their spouses, as they too are getting older. Women who manage multiple caregiving roles, sometimes in

addition to a paid job, may not have time to consult health professionals about every health condition or question they are faced with. In the US, a survey revealed that 35% of online health consumers consist of the chronically ill and their caregivers (Cain et al., 2000). Approximately 60% of people 30 to 49 years old and 54% of those 50 and older say that they go online to find health information for their family members. Although the gender distribution for this response was not available, it is predicted that the majority would have been women. Health conscious women in particular are more likely to go online to find health information (Pandey et al., 2003). It is evident then, that a combination of factors makes midlife women a prime target for online health information that is relevant to their unique life stage and more likely to go looking for it for family.

If socioeconomic status is a predictor of Internet access and use, then people who have Internet access are going to be more likely to search for online health information than people who do not have Internet access. In a US study, searching specifically for health information online was associated with higher education and income among seniors (Kaiser Family Foundation, 2005). An underlying assumption is that searching for online health information is positively associated with health education which can influence health status. Unfortunately, the reality is that people in poorer health are less likely to have Internet access due to the digital divide (Goldner, 2006). Also, people with lower health status may be less physically able to use the Internet. Socioeconomic status and health status are therefore expected to be positively associated with searching for online health information.

Hypotheses:

7. Baby boomers will be more likely to have used the Internet at home to search for medical or health related information in the last 12 months than older cohorts and will be more likely to have found the information useful.
8. Baby boomer women (“the sandwich generation”) will be more likely to have used the Internet at home to search for medical or health related information in the last 12 months than baby boomer men and older cohorts.
9. Socioeconomic status will be positively associated with searching for online medical or health related information in the last 12 months for all age groups.
10. Health status will be positively associated with ever searching for medical or health related information and with frequency of medical or health related searches in the last month, for all age groups.

Barriers to Internet Access and Use

The digital divide that exists when it comes to using the Internet and other technologies relates to important barriers that deserve more attention. The potential of the Internet as a health promotion tool will never be realized if the barriers underlying the digital divide are not addressed. Socioeconomic status (i.e. education and income) is associated with Internet access and use (Cain et al., 2000; US Department of Health and Human Service, 2006). In terms of barriers, this translates to cost, access and skills. These barriers are expected to be the most common barriers reported to using the Internet for non-users. Lack of skills may be especially important for the older cohorts, since they have not had the same exposure as the baby boomers.

In the Kaiser Family Foundation Report (2005), adults aged 50 to 64 were found to be more trusting of the Internet for health information than other age groups. Approximately 58% of these people said they trust it “a lot” or “some”. This is in contrast

to people over 65 where only 26% said that they would trust the Internet to provide accurate information about health issues. Being too trustful of health information can be negative because it can lead to improper self-diagnoses, self-medication or a misunderstanding of treatments options. If a person delays proper diagnosis or treatment, the condition could worsen and lead to poor health outcomes. Being highly untrusting of health information on the Internet can be negative as well because these people may be missing out on valuable information that could be beneficial to their health, such as important cues to action that could lead them to change their health behaviours.

Hypotheses:

11. Cost, access and lack of skills will be the greatest barriers to using the Internet from home for all age groups, and that of those, lack of skills will be the most common barrier reported for the older cohorts.
12. Older adults will be more concerned about privacy when using the Internet than the baby boomer cohorts.

Chapter Five: Methodology

Data

The data analyzed for this target study will be taken from two data sets: 1) The 2005 Canadian Internet Use Survey (CIUS) and 2) The 2000 General Social Survey (GSS), Cycle 14: Access to and Use of Information Communication Technology. The CIUS data set will be used whenever possible, since it is the most recent (2005); however, in order to increase coverage of the topic, relevant issues not covered by the CIUS will be supplemented by the GSS.

2005 Canadian Internet Use Survey (CIUS)

The CIUS replaced the Household Internet Use Survey (HIUS), which was used between 1997 and 2003 to measure household Internet use. It was redesigned in 2005 to focus on how individuals (rather than households) use the Internet. This was done in order to bring it up to date with international standards of Internet use surveys. The sample includes people aged 15 and over in the 10 provinces. People living in institutions, full-time members in the armed forces, and people living on Indian Reserves are not included in the study (approximately 2% of the total population were excluded). A stratified, multi-stage design using probability sampling was employed.

At the time of the study in 2005, the baby boomers ranged in age from 40-59, however due to a lack of 5-year age groups, using the exact ages of the baby boomers is not possible; instead, the sample will include people aged 35-54 as a rough proxy. This

sample will be compared to those 55-64 and 65 and older. When weighted to adjust for sampling error, the resulting sample size is 23,309 (Statistics Canada, 2007).

2000 General Social Survey (GSS)

This was the first GSS cycle to collect data on technology use in Canada, focusing specifically on computer and Internet use. The GSS has two primary objectives:

- (1) To gather data on social trends in order to monitor changes in the living conditions and well-being of Canadians over time
- (2) To provide immediate information on specific social policy issues of current or emerging interest

Statistics Canada (2001)

GSS respondents were randomly selected from households using the Random Digit Dialing approach. In order to be eligible to participate in the survey, respondents had to be 15 years of age or older and a resident of Canada (excluding residents of the Yukon, Northwest Territories and Nunavut and full-time residents of institutions). At the time of the study, the baby boomers ranged in age between 35 and 54 years old. When combined with the 55- 64 and 65 and older groups, the final weighted sample is 17,415 respondents (Statistics Canada, 2001).

Independent Variables

The sample will be divided by age in order to make age comparisons among boomers of different ages, and between boomers and older adults. Therefore age comparisons will be used in three different ways:

1. To examine patterns of Internet access and use in general, and specifically for health information, by 10 years age groups across the adult population (35-44, 45-54, 55-64 & 65+).

2. To compare baby boomers to older adults (35-54 to 55-64 and 65+).
3. To compare younger boomers to older boomers (35-44 to 45-54).

The back edge of the baby boomers (younger boomers) will include respondents between the ages of 35-44 and the front edge (older boomers) will include respondents between the ages of 45-54. The cohorts ahead of the baby boomers will include adults 55-64 and 65 and older. Other independent variables include sex (male/female), marital status (married/not married), region (urban/rural), education (high school or less/post-secondary or more), income (lower/lower middle/middle/upper middle/upper) and health status (poor/fair/good/very good/excellent) (see Table 5.1). Region (urban/rural) areas are based on census definitions. Urban areas are those with more than 1,000 people while rural areas include small towns, villages and places with less than 1,000 people (including agricultural lands and remote and wilderness areas) (Statistics Canada, 2003). Table 5.1 shows the complete list of independent variables, their coding and the data set from which they originated (2000 vs. 2005).

Table 5.1: Independent variables and coding used in the bivariate and multivariate analyses.

Independent Variable	Coding	Data Set
Age	1= 35-44	2005
	2= 45-54	2000
	3= 55-64	
	4= 65+	
Sex	1= Male	2005
	2= Female	2000
Marital Status	0= Not married	2005
	1= Married	2000
Region	0= Non-urban	2005
	1= Urban	2000
Education	0= High school or less	2005
	1= Post-secondary or more	2000
Income	0= Lower Income	2005
	1= Lower Middle	2000
	2= Middle	
	3= Upper Middle	
	4= Upper	
Health Status	0= Poor	2000
	1= Fair	
	2= Good	
	3= Very Good	
	4= Excellent	

Dependent Variables

Dependent variables were recoded based on whether it was logical to assume that respondents should be categorized as yes or no, depending on the question. For example, for the question “During the last 12 months, did you use the Internet from home for personal non-business use?” (yes or no), non-users of the Internet were coded as ‘no’ since they don’t use the Internet it would be logical to assume that this would be their response. This method allowed for an increased sample size by minimizing large numbers of missing data. In order to increase the validity of certain responses, missing

data (i.e. those who weren't asked the question) were left out for some questions. Otherwise, an accurate reading of responses would not have been possible. For example, regarding the types of health information searched for (i.e. lifestyle, healthcare, symptoms), only people that indicated they use the Internet for health information were originally asked the question, therefore they were the only ones included. In other words, non-users were left out of the analysis. In cases where missing data was due to responses such as 'don't know', 'not stated' or 'refuse', these responses were recoded to the mode. Table 5.2 includes a complete list of the dependent variables, their coding and the data set from which they originated (2000 vs. 2005).

Table 5.2: Dependent variables and coding used in the bivariate and multivariate analyses.

Dependent Variables	Wording of Question	Coding	Data Set
<i>Internet Access and Use</i>			
Ever used Internet	Have you ever used the Internet (e-mail or World Wide Web) from home, work, school or any other location for personal non-business use?	0= No 1= Yes	2005
Used Internet in the last 12 months	In the past 12 months did you use the Internet?	0= No 1= Yes	2000
Access to computer	Do you have access to a computer at home, work, school or other location?	0= No 1= Yes	2000
Years since first used Internet	How many years have you used the Internet?	0= Never used 1= Less than 5 years 2= Five or more years	2005
Internet use at home in the last 12 months	During the last 12 months, did you use the Internet from home for personal non-business use?	0= No* 1= Yes *Includes non-users	2005
Internet use at work in the last 12 months	During the last 12 months, did you use the Internet from work for personal non-business use?	0= No* 1= Yes *Includes non-users	2005
Frequency of Internet use at home in a typical month	How often do you use the Internet at home in a typical month?	0= Not at all* 1= Once a month or less 2= At least once a week 3= Everyday *Includes non-users	2005
Frequency of Internet use at work in a typical month	How often do you use the Internet at work for personal non-business use in a typical month?	0= Not at all* 1= Once a month or less 2= At least once a week 3= Everyday	2005

Dependent Variables	Wording of Question	Coding	Data Set
		*Includes non-users	
Internet Use for Health Information			
Used Internet for health information in the last 12 months	During the past 12 months have you used the Internet at home to search for medical or health related information?	0= No* 1= Yes *Includes non-users	2005
Ever used the Internet for health information	Have you ever used the Internet to search for medical or health-related information?	0= No* 1= Yes *Includes non-users	2000
Frequency of Internet use for health information in the last month	In the last month, how often did you use the Internet to search for medical or health-related information?	0= Never* 1= Not in the last month 2= A few times a month 3= Several times a week 4= Everyday *Includes non-users	2000
Type of health-related search	What kind of medical or health-related information do you search for on the Internet? (Lifestyle; Alternative therapy; Healthcare system/delivery; Drugs/medications; Surgeries; Specific diseases; Symptoms; Other)	0= No* 1= Yes* *Includes <i>only</i> people who have used the Internet for health information	2000
Type of health-related Internet sites visited	What types of Internet sites do you visit for health information? (Health Canada sites; Other government sites; Professional Health Association sites; Non-profit organization sites; Commercial sites; University sites; Other; Just search)	0= No* 1= Yes* *Includes <i>only</i> people who have used the Internet for health information	2000
Usefulness of health information found	In general, how useful have you found this information?	0= Do not use* 1= Not at all useful 2= Somewhat or very useful *Includes non-users of the Internet and those who have never used the Internet for health information	2000

Dependent Variables	Wording of Question	Coding	Data Set
<i>Barriers to Using the Internet</i>			
Greatest barrier to using the Internet	What is the greatest barrier that keeps you from using the Internet from home?(they can only choose one)* *Includes <i>only</i> non-users	1= Cost 2= Access 3= Lack of skills 4= No need/not useful/no interest 5= Not enough time 6= Other	2005
Privacy concerns about using the Internet	In general, how concerned (are you/would you be) about privacy on the Internet? For example, people finding out what websites you have visited, others reading your email?*	0= Not at all concerned 1= Concerned 2= Very concerned	2005
Responsibility to ensure barriers are removed	Who should take the greatest responsibility to ensure barriers are removed? (Federal government; Other levels of government; International agencies; Private industry; Individuals; Other; No one)* *Includes all respondents	0= No 1= Yes	2000

Statistical Analyses

The statistical analysis has two components. The first component is an exploratory analysis of the patterns using bivariate methods. The second component of the statistical analysis will be a multivariate analysis to examine the factors associated with Internet use for health information. Specifically, a logistic regression model will be used.

Chapter Six: Results

Bivariate Analysis

The bivariate analysis was divided into three stages: 1) Internet access and use patterns 2) Internet health information use patterns 3) Barriers to Internet use. The first two stages were cross tabulated with age, other demographic variables (sex, marital status, region), socioeconomic status (education and income) and health status. The third stage (barriers to Internet use) was cross tabulated with age. In each of these stages, the results pertaining to the specific hypotheses are reported first, where the hypotheses are either supported or refuted. This is followed by a synthesis of other results relating to the research questions. Figures are shown only for those associations pertaining to the main hypotheses and research questions.

Internet Access and Use Patterns

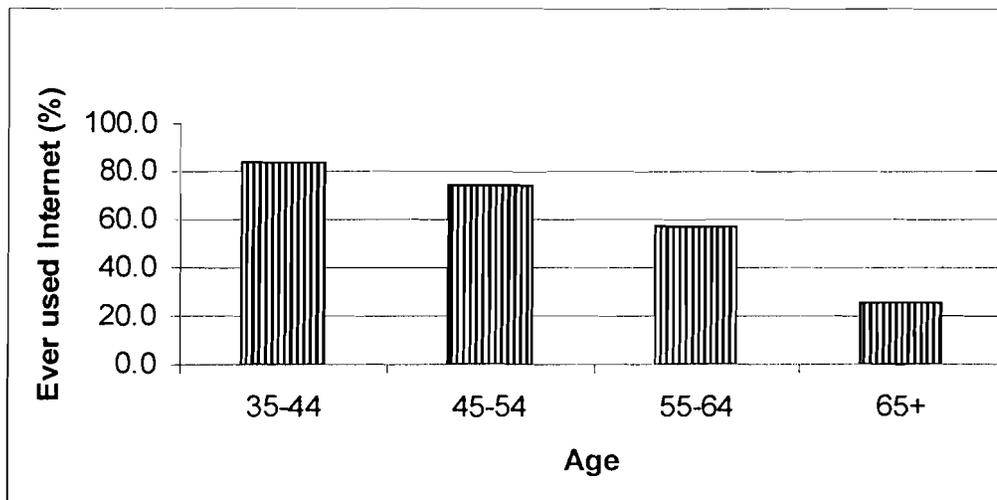
Age Comparisons of Internet Access and Use

The dichotomous Internet use and access variables were treated as interval variables in the analysis and are therefore not expressed using chi square. The results for the ordinal variables (including those that were originally ordinal but recoded to dichotomies) are expressed using tau b and tau c.

There was a strong negative association between age and ever using the Internet (tau c= -0.46, $p < 0.001$), where approximately 84% of adults 35-44 and 74% of adults 45-54 reported ever used the Internet compared to 57% of people 55-64 and only 26% of

people 65 and older (see Figure 6.1). Similarly, there was a strong negative association between age and having access to a computer from any location ($\tau c = -0.50, p < 0.001$). Approximately 78% of people 35-44 reported having access to a computer from any location compared to 17% of people 65 and older. These results support the hypothesis that baby boomers are more likely than older adults to have ever used the Internet for personal use and are more likely to have access to a computer from any location.

Figure 6.1: Percentage of adults that have ever used the Internet by age group.

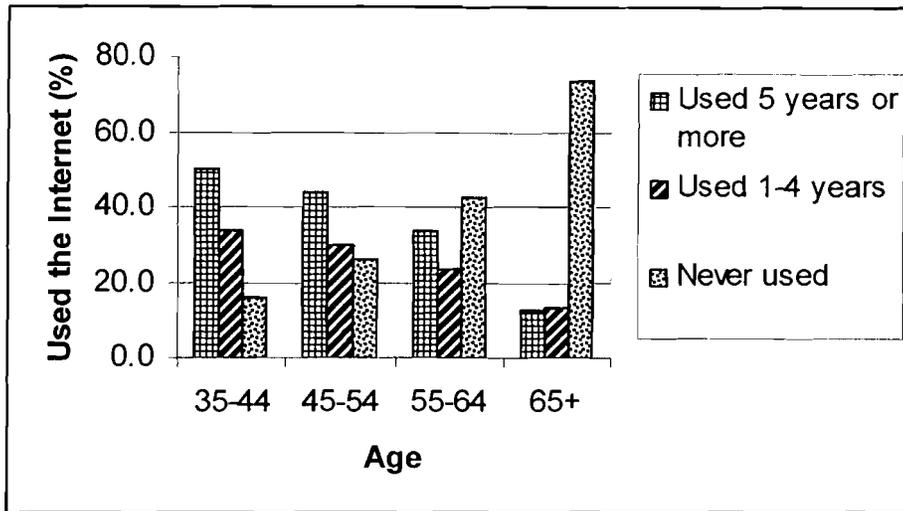


Statistics: $\tau c = -0.46, p < 0.001$

Not only are baby boomers more likely to have ever used or have access to the Internet, they are also more likely to have used it for a longer period of time than older cohorts. There was a moderate negative association between age and length of time since they started using the Internet ($\tau c = -0.36, p < 0.001$). Approximately 50% of people 35-44 had used the Internet for five or more years, while 34% of this group had used it for one to four years. Only 13% of people 65 and older had used the Internet for five or more years, while another 14% reported using it for one to four years. This means that the remaining 74% of people 65 and older have never used the Internet. This supports the

hypothesis that the baby boomers have used the Internet for a longer period of time than older cohorts (see Figure 6.2).

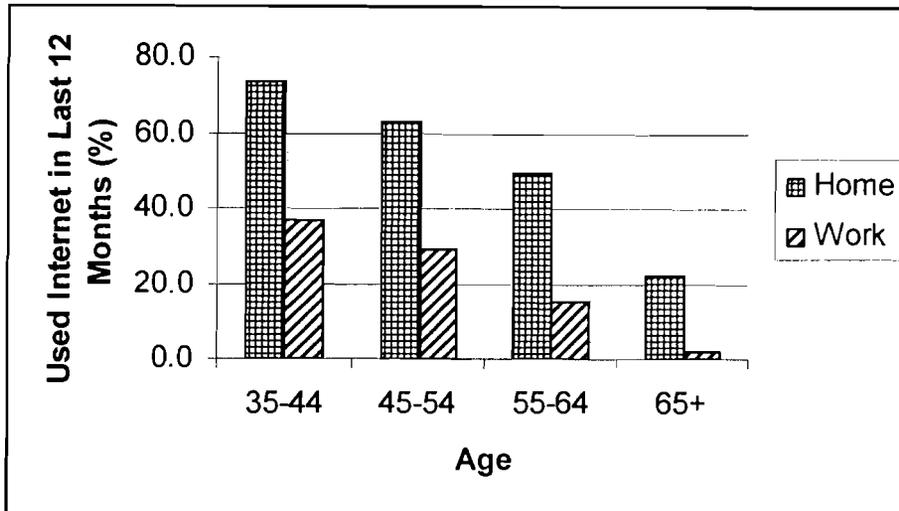
Figure 6.2: Length of time since starting to use the Internet by age group.



Statistics: tau c= -0.36, p<0.001

Figure 6.3 shows that the baby boomers are also more likely to have used the Internet from home and from work in the last 12 months for personal non-business use compared to older cohorts. Approximately 74% of those 35-44 and 63% of those 45-54 reported using the Internet from home in the last 12 months, compared to 49% of those 55-64 and only 23% of those 65 and older (tau c= -0.41, p<0.001). The reported rates of use from work were lower than those from home, however there was still a moderate negative association between age and use. Approximately 37% of people 35-44 and 30% of those 45-54 reported using the Internet from work in the last 12 months compared to 15% of those 55-64 and 2% of those 65 and older (tau c= -0.29, p<0.001). This supports the hypothesis that baby boomers will be more likely than older adults to have used the Internet from home and from work in the last 12 months.

Figure 6.3: Percentage of people who have used the Internet from home and from work in the last 12 months for personal non-business use by age group.



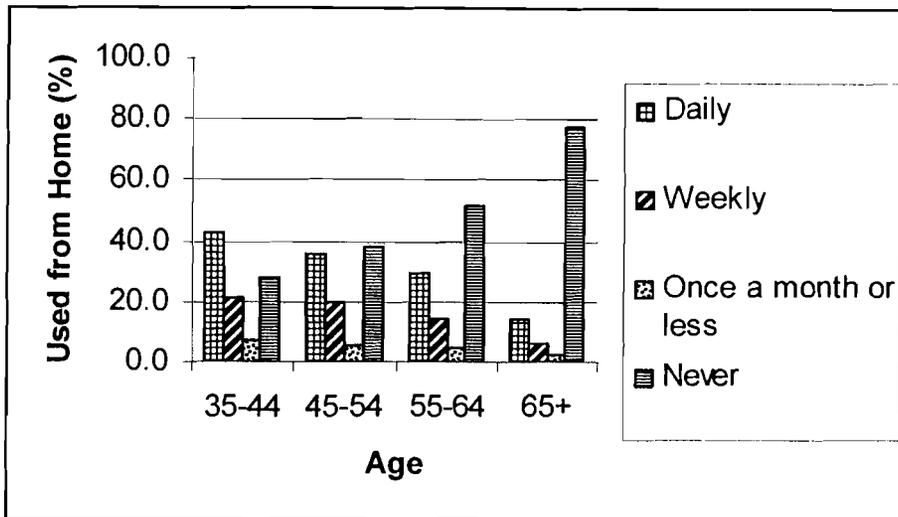
Statistics (home): tau c= -0.41, p<0.001

Statistics (work): tau c= -0.29, p<0.001

Baby boomers are also more frequent users of the Internet at home and at work for personal non-business use compared to older age groups. There was a moderate negative association between age and frequency of use at home in a typical month (tau b= -0.28, p<0.001). Approximately 43% the 35-44 group and 36% of the 45-54 group reported using the Internet daily at home in a typical month, compared to only 14% of those 65 and older. In total, approximately 65% of people 35-44 and 56% of people 45-54 reported using the Internet at least once a week at home, compared to 20% of those 65 and older (see Figure 6.4). Although there were lower frequency rates for Internet use at work, there was still a moderate negative association between age and frequency of use at work (tau b= -0.24, p<0.001), where approximately 22% of adults 35-44 reported using the Internet at work at least once a week for personal non-business use, compared to 9% of those 55-64 and about 1% of those 65 and older. This supports the hypothesis that

frequency of Internet use from home and work for personal use in a typical month will be higher for the cohorts comprising the baby boomers than for older cohorts.

Figure 6.4: Frequency of Internet use from home in a typical month by age group.



Statistics: tau b= -0.28, p<0.001

Age Comparisons of Internet Access and Use by Demographic Variables

Demographic variables and their associations with Internet use were examined in order to compare age differences and find out how they influence Internet use patterns. The demographic variables examined were sex, marital status and urban/rural dwelling. Since the demographic variables are categorical, chi square was used.

It was found that similar proportions of men and women have ever used the Internet in the baby boomer groups, with women reporting slightly higher rates. For older adults (65 and older), men appeared to be more likely to have ever used the Internet, where approximately 32% of men reported ever using the Internet compared to 22% of women ($\chi^2= 63.67$, $df= 1$, $p<0.001$). The results for the 55-64 group were not statistically significant. Older men (55+) also tend to have access to a computer more than women,

whereas among baby boomers, women tend to have access to a computer more than men. There was a weak association between sex and frequency of Internet use, where men reported using the Internet more frequently than women for all age groups ($p < 0.001$).

Being married compared to not married was also positively associated with ever using the Internet for all age groups. For the younger boomers (35-44), approximately 86% of those married reported ever using the Internet, compared to 76% of those who were not married ($\chi^2 = 85.97$, $df = 1$, $p < 0.001$). For the older boomers (45-54), 76% of married people had used the Internet compared to 67% of those not married ($\chi^2 = 55.26$, $df = 1$, $p < 0.001$). The rates of use across marital status were similar for the older age groups, although the proportion of people having ever used the Internet was lower compared to the baby boomers. For the 55-64 group, 59% of married people had ever used the Internet, compared to 51% of those not married ($\chi^2 = 22.90$, $df = 1$, $p < 0.001$). Of those married in the 65 and older group, 31% had ever used the Internet compared to 19% of those who were not married ($\chi^2 = 97.04$, $df = 1$, $p < 0.001$). Being married compared to not married was also positively associated with having access to the Internet and with frequency of Internet use in a typical month, where statistically significant results were found for all age groups ($p < 0.001$).

As expected, living in an urban area was positively associated with Internet access and use for all age groups, but the associations are weak. For the 45-54 age group, 77% of people living in urban areas had ever used the Internet, compared to 66% of those living in non-urban areas ($\chi^2 = 68.56$, $df = 1$, $p < 0.001$). For the 55-64 age group, the percentage difference was even greater. Of those living in urban areas, approximately 61% of people had ever used the Internet compared to 47% of those living in non-urban

areas ($\chi^2= 74.07$, $df= 1$, $p<0.001$) and 29% of those 65 and older living in urban areas had ever used the Internet compared to 20% of those living in rural ($\chi^2= 45.98$, $df= 1$, $p<0.001$). Regarding access, about 75% of those 45-54 living in urban areas reported having access to a computer, compared to 62% of the same age group living in rural areas ($\chi^2= 69.85$, $df= 1$ $p<0.001$). For those 55-64, 53% of urban dwellers had access to a computer compared to 42% of those in rural areas ($\chi^2= 28.22$, $df= 1$ $p<0.001$). The results for the 65 and older group were statistically significant, however minimal differences were found. Weak positive associations were also found between living in an urban area and frequency of Internet use for all age groups, where people living in urban areas were more likely to use the Internet daily from home in a typical month than people living in rural areas ($p<0.001$).

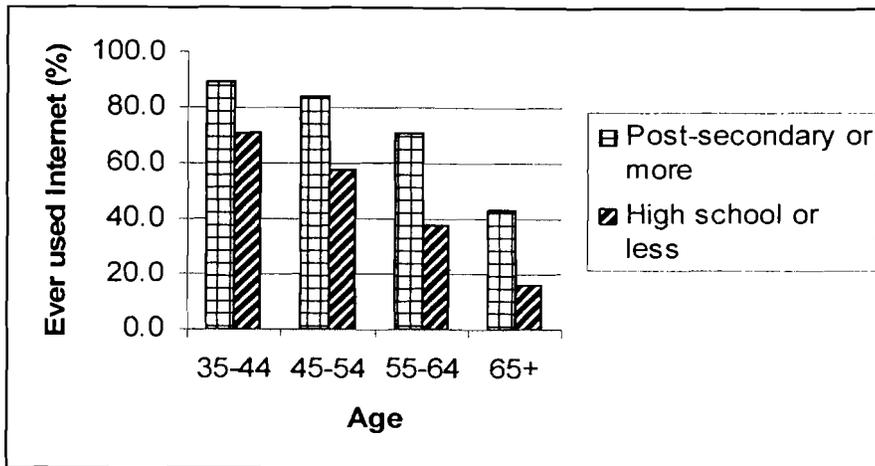
Age Comparisons of Internet Access and Use by Socioeconomic Variables

Education and income were treated as ordinal variables and are therefore described statistically using tau b (education) and tau c (income). There was a moderate positive association between education and ever using the Internet for all age groups (see Figure 6.5). For the younger boomers, approximately 90% of those with a post-secondary education reported ever using the Internet, compared to about 70% of those whose education consisted of high school or less (tau b= 0.24, $p<0.001$). For the older boomers, 84% of those with a post-secondary education reported ever using the Internet compared to 58% of those who attended high school or less (tau b= 0.29, $p<0.001$). The largest percentage difference was for those 55-64, where 71% of those with a post-secondary education reported ever using the Internet, compared to 38% who attended high school or less (tau b= 0.33, $p<0.001$). For the 65 and older group, 43% of those who had a post-

secondary education or more had ever used the Internet, compared to 16% of those who had a high school education or less ($\tau b = 0.29, p < 0.001$).

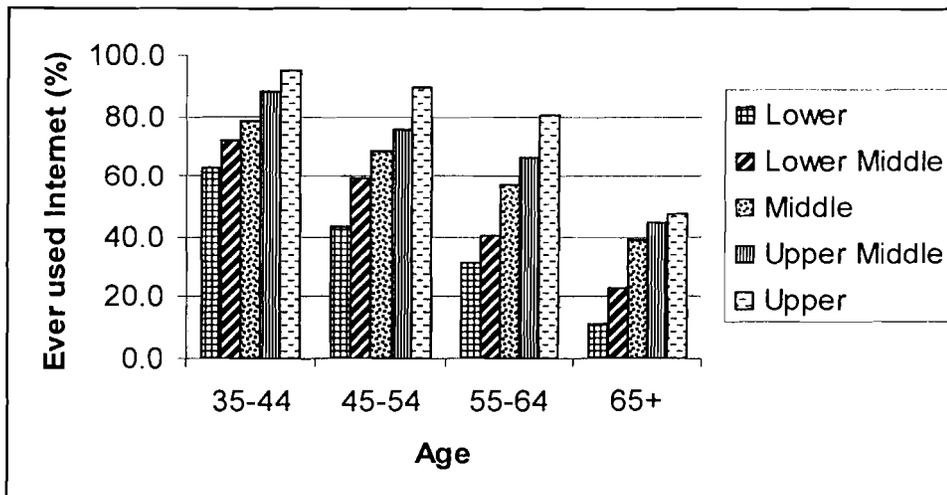
There was also a moderate positive association between having ever used the Internet and being in the upper and upper middle income quintile compared to the lower income quintile for all ages (see Figure 6.6). For those 35-44, 63% of people in the lower income quintile reported ever using the Internet compared to 88% in the upper middle and 95% in the upper income quintile ($\tau c = 0.23, p < 0.001$). For the 65 and older group, 11% of people in the lower income quintile reported ever using the Internet compared to 45% in the upper middle and 48% in the upper income quintile ($\tau c = 0.29, p < 0.001$). The gradient was similar for those 45-54 ($\tau c = 0.31, p < 0.001$) and 55-64 ($\tau c = 0.38, p < 0.001$). This supports the hypothesis that socioeconomic status will be positively associated with ever using the Internet for all age groups.

Figure 6.5: Percentage of people that have ever used the Internet by education level controlling for age.



Statistics: 35-44: tau b= 0.24, p<0.001; 45-54: tau b= 0.29, p<0.001; 55-64: 0.33, p<0.001; 65+: tau b= 0.29, p<0.001.

Figure 6.6: Percentage of people that have ever used the Internet by income level controlling for age.



Statistics: 35-44: tau c= 0.23, p<0.001; 45-54: tau c= 0.31, p<0.001; 55-64: 0.38, p<0.001; 65+: tau c= 0.29, p<0.001.

Socioeconomic status was also associated with having access to a computer.

There was a moderate positive association between having a post-secondary education and having access to a computer for all age groups, with the baby boomers having the highest percentages of people with a post-secondary education and computer access

compared to the older groups. There was a moderate positive association between being the upper income quintile compared to the lower income quintile and having access to a computer for all age groups except those 65 and older. For the 35-44 group, approximately 53% of people in the lower and 67% in the lower middle reported having access to a computer compared to 95% in the upper income quintile ($\tau c = 0.21$, $p < 0.001$). Approximately 41% of people in the lower income quintile reported having access to a computer, compared to 91% in the upper income quintile for the 45-54 age group ($\tau c = 0.28$, $p < 0.001$). For the 55-64 group, 21% of people in the lower income quintile reported having access to a computer, compared to 88% in the upper income quintile ($\tau c = 0.29$, $p < 0.001$). For the 65 and older group, 7% of people in the lower and 16% of people in the lower middle reported having access to a computer, compared to 55% in the upper income quintile ($\tau c = 0.07$, $p < 0.001$). This supports the hypothesis that socioeconomic status will be positively associated with having access to a computer from any location for all age groups.

Socioeconomic status was also found to be positively associated with frequency of Internet use at home and at work in a typical month. For the 35-44 group, there was a moderate positive association between education and frequency of Internet use, where 49% of people with a post-secondary education reported using the Internet from home daily in a typical month compared to 29% of those with a high school education or less ($\tau c = 0.23$, $p < 0.001$). There were also moderate positive associations for the other age groups, including the 65 and older group, where 34% of those with a post-secondary education reported using the Internet daily compared to 8% of those with a high school education or less ($\tau c = 0.22$, $p < 0.001$). Similar results were found for income, where

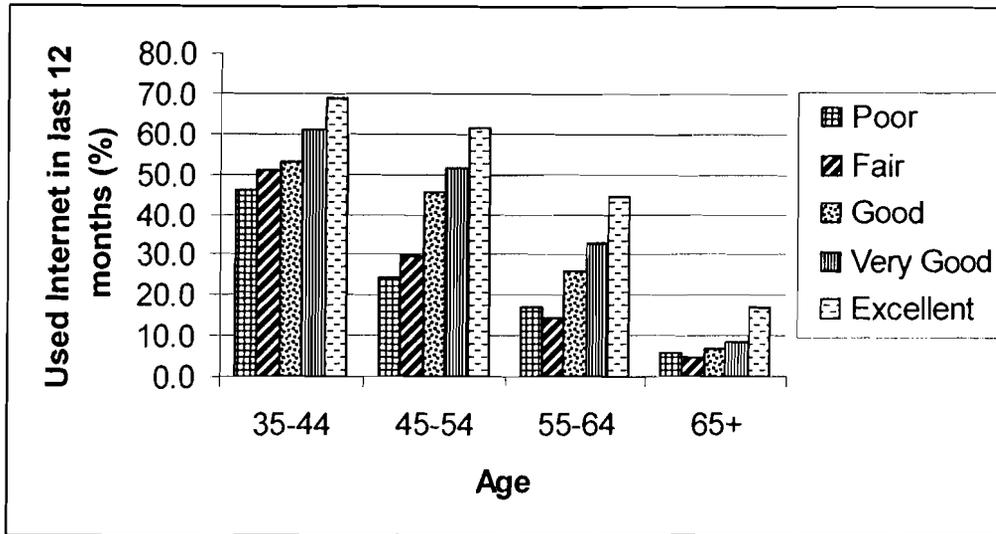
there were moderate positive associations found between income and using the Internet from home daily in a typical month for all age groups ($p < 0.001$). For example, in the 35-44 age group, 56% of people in the upper income quintile and 42% of people in the upper middle income quintile reported using the Internet from home daily compared to 29% of people in the lower income quintile ($\tau c = 0.23$, $p < 0.001$). For the 55-64 group, 45% of people in the upper income quintile reported using the Internet from home daily compared to 19% of those in the lower middle and 13% of those in the lower income quintile ($\tau c = 0.26$, $p < 0.001$).

Age Comparisons of Internet Access and Use by Health Status

Using the data from the 2000 GSS, there were weak positive associations found between health status (self-reported) and having used the Internet in the last 12 months for all age groups, except for the 55-64 age group where the association was stronger. For the latter group, 17% of people in poor health reported using the Internet in the last 12 months compared to 26% of people with good, 33% of people with very good and 45% of people with excellent health ($\tau c = 0.2$, $p < 0.001$). For the younger boomers, 46% of people in poor health and 51% with good health reported having used in the Internet in the last 12 months, compared to 61% with very good health and 69% with excellent health ($\tau c = 0.14$, $p < 0.001$). For the older boomers, 24% of people with poor health and 30% of people with fair health reported using the Internet in the last 12 months, compared to 46% with good, 52% with very good and 61% with excellent health ($\tau c = 0.19$, $p < 0.001$). For the 65 and older group, 17% of people with excellent health reporting using the Internet in the last 12 months, compared to 5.7% of people with poor health ($\tau c = 0.07$, $p < 0.001$). These results support the hypothesis that health status is

positively associated with having used the Internet in the last 12 months for all age groups (see Figure 6.7). However, the associations range from moderate to weak, and is weakest for the 65 and older group.

Figure 6.7: Percentage of people that have used the Internet in the last 12 months by health status controlling for age.



Statistics: 35-44: tau c= 0.14, p<0.001; 45-54: tau c= 0.19, p<0.001; 55-64: tau c= 0.2, p<0.001; 65+: tau c= 0.07, p<0.001.

Health status was also positively associated with having access to a computer and frequency of Internet use. There was a weak positive association between having access to a computer and health status for all age groups (p<0.001), except for the 55-64 group, where there was a moderate positive association. In this group, approximately 32% of people in poor reported having access to a computer compared to 53% of those in very good health and 64% of people with excellent health (tau c= 0.22, p<0.001). For the younger boomers, 61% of people with poor health had access to a computer, compared to 80% of those with very good health and 85% of those with excellent health (tau c= 0.13, p<0.001). There was a weak positive association between frequency of Internet use and

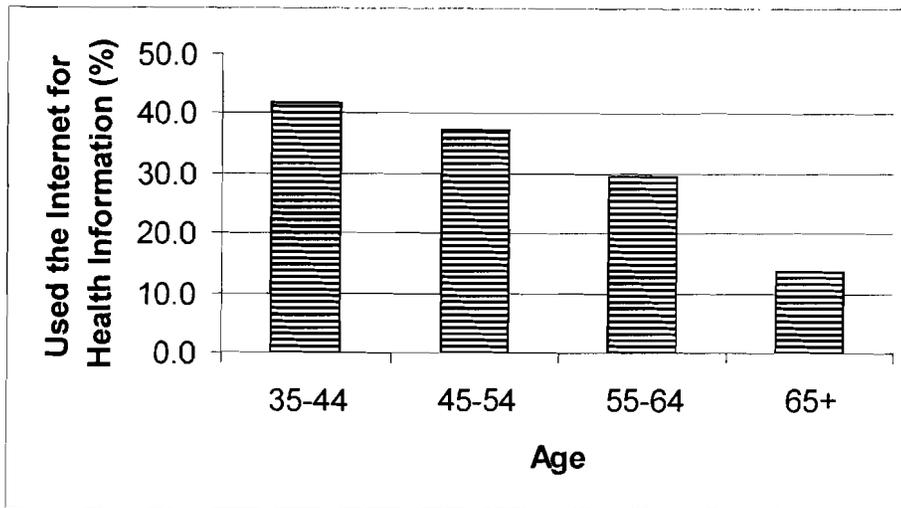
health status, where 32% of younger boomers and 20% of older boomers with poor health reported using the Internet from home a few times a month or more, compared to 45% of younger boomers and 42% of older boomers with excellent health ($p < 0.001$). The results were also significant for the older age groups, where 11% of those 55-64 and 5% of those 65 and older with poor health reported using the Internet from home at least a few times a month, compared to 34% of those 55-64 and 14% of those 65 and older with excellent health ($p < 0.001$).

Internet Health Information Use Patterns

Age Comparisons of Internet Health Information Use

As hypothesized, there was a moderate inverse association found between age and using the Internet to search for health information in the last 12 months ($\tau c = -0.23$, $p < 0.001$). Figure 6.8 shows that approximately 42% of younger boomers and 38% of older boomers reported using the Internet to search for health information in the last 12 months, compared to about 30% of those 55-64 and 14% of those 65 and older.

Figure 6.8: Percentage of people who have used the Internet for health information in the last 12 months by age group.



Statistics: tau c= -0.23, p<0.001

Baby boomers tended to find health information on the Internet more useful than older adults. There was a weak negative association between age and finding Internet health information useful (tau c= -0.16, p<0.001). Approximately 30% of people 35-44 years old and 24% of people 45-54 years old found Internet health information somewhat or very useful, compared to 15% of people 55-65 and 4% of those 65 and older. This supports the hypothesis that baby boomers will be more likely to have used the Internet at home to search for health information in the last 12 months compared to older cohorts and that they will be more likely to have found the information useful.

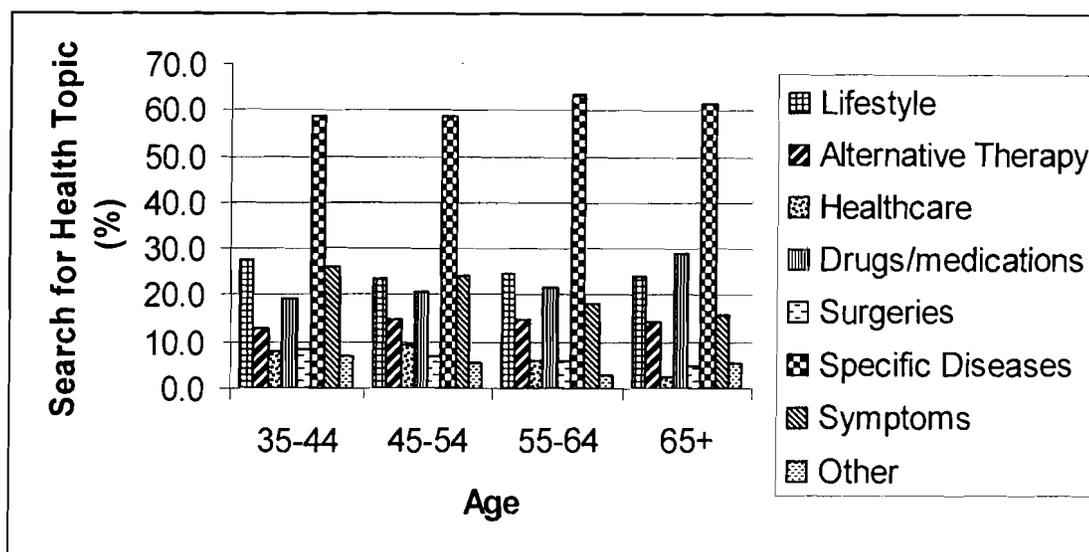
Frequency of using the Internet to search for health information was found to be negatively associated with age, where younger cohorts use it for this purpose more often. Approximately 17% of people 35-44 and 14% of those 45-54 reported using the Internet for health information a few times a month or more compared to 9% of those 55-64 and 3% of those 65 and older (tau c= -0.13, p<0.001).

Other interesting findings relate to the types of health related information that people search for (see Figure 6.9) and the types of Internet sites visited (see Figure 6.10) using the GSS 2000. In the original questionnaire only the people who use the Internet for health information were asked what types of information and sites they searched. In order to get an accurate representation of how and why people use the Internet for health information, only those who reported using the Internet for health information were included in this part of the analysis (type of information search: $n= 3547/20.4\%$; type of site visited: $n= 2389/13.7\%$). Each dependent variable was measured separately and represents a dichotomy (yes/no), therefore chi square was used.

The results were not statistically significant for searching for lifestyle (i.e. diet, exercise, illness prevention) information, alternative therapy (i.e. herbal medications, aromatherapy, acupuncture), surgeries (i.e. hernia, appendectomy) or specific diseases (i.e. diagnosis, new research, treatment) (see Figure 6.9). There was a negative association between age and searching for information on symptoms (i.e. rash, fatigue, mole) ($\chi^2= 20.73$, $df= 3$, $p<0.001$). Approximately 26% of younger boomers and 24% of older boomers reported searching for information on symptoms, compared to 18% of those 55-64 and 16% of those 65 and older. There was also a negative association between age and searching for information on the health care system ($\chi^2= 14.1$, $df= 3$, $p<0.01$). Conversely, there was a positive association between age and searching for information drugs or medications (i.e. aspirin, corticosteroids, Viagra) ($\chi^2= 9.0$, $df= 3$, $p<0.05$). Approximately 29% of people 65 and older reported searching for this type of information compared to 19% of those 35-44. The most common type of search for all age groups was searching for information on specific diseases, where between 59% and

64% of all groups reported searching for this type of information, although the results were not statistically significant for age differences (see Figure 6.9).

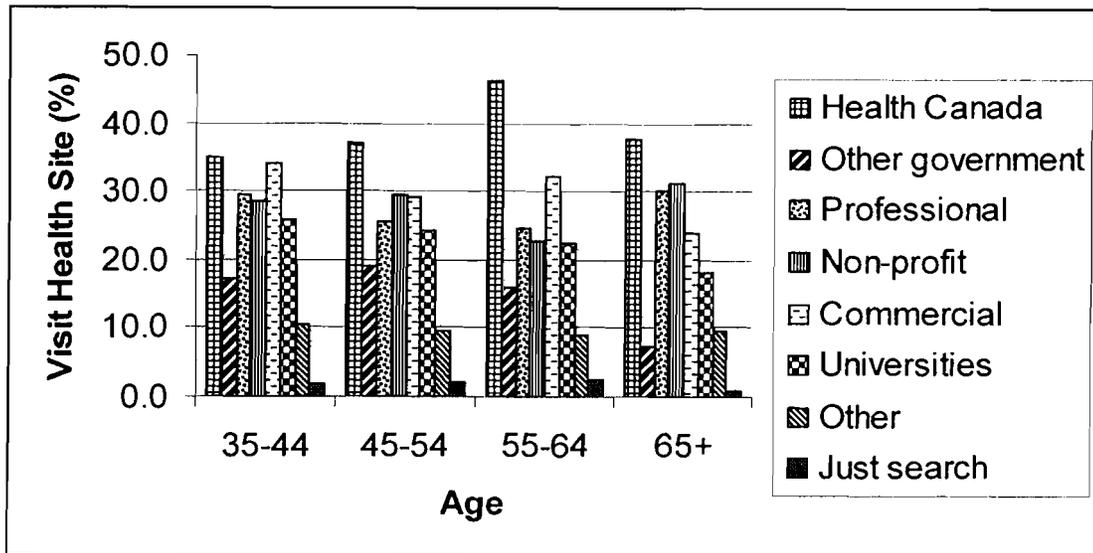
Figure 6.9: Type of Internet health information search by age group.



Statistics: Healthcare: $\chi^2= 14.1$, $df= 3$, $p<0.01$; Drugs/medications: $\chi^2= 9.0$, $df= 3$, $p<0.05$; Symptoms: $\chi^2= 20.73$, $df= 3$, $p<0.001$; Other: $\chi^2= 10.92$, $df= 3$, $p<0.05$. The results for the other variables were not statistically significant.

There was a positive association found between age and searching for health information on Health Canada sites ($\chi^2= 13.62$, $df= 3$, $p<0.01$), although the association was weak; however Health Canada sites were also the most popular sites visited for all age groups (see Figure 6.10). There was a negative association between age and searching for information on other types of government sites ($\chi^2= 10.43$, $df= 3$, $p<0.05$). A negative association was also found between age and searching for health information on commercial sites (i.e. drug companies) ($\chi^2= 8.1$, $df= 3$, $p<0.05$). Percentages reported for searching other sites including professional health association sites (i.e. Canadian Medical Association), non-profit sites (i.e. Cancer Society, Red Cross), university sites and other sites were not statistically significant.

Figure 6.10: Type of Internet sites visited for health information by age group.



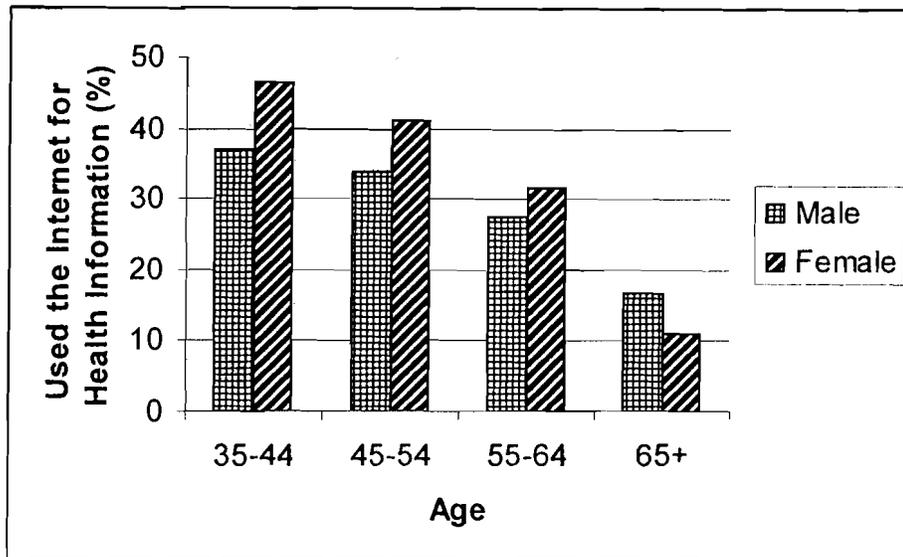
Statistics: Health Canada sites: $\chi^2= 13.62$, $df= 3$, $p<0.01$; Other government sites: $\chi^2= 10.02$, $df= 3$, $p<0.05$; Commercial sites: $\chi^2= 8.1$, $df= 3$, $p<0.05$. The results for the other variables were not statistically significant.

Age Comparisons of Internet Health Information Use by Demographic Variables

There was a weak positive association found between being female and using the Internet to search for health information in the last 12 months for the baby boomers. Approximately 37% of males 35-44 reported using the Internet for health information compared to about 47% of females of the same age ($\chi^2= 60.54$, $df= 1$, $p<0.001$). For those 45-54, similar results were found where 34% of males reported using the Internet for health information in the last 12 months compared to 41% of females ($\chi^2= 35.87$, $df= 1$, $p<0.001$). There was close to no relationship (less than 5%) between being female and using the Internet for health information for the 55-64 age group, and there was a weak negative association for the 65 and older group, where 17% of males reported using the Internet for health information, compared to 11% of females of the same age ($\chi^2=34.28$, $df=1$, $p<0.001$). These results support the hypothesis that baby boomer women will be more likely to have used the Internet at home to search for health information in the last

12 months than baby boomer men and older cohorts, although the results are not as strong as expected (see Figure 6.11). The weak negative association for the 65 and older group was also unexpected.

Figure 6.11: Percentage of males and females that used the Internet for health information in the last 12 months by age group.



Statistics: 35-44: $\chi^2= 60.54$, $df= 1$, $p<0.001$; 45-54: $\chi^2= 35.87$, $df= 1$, $p<0.001$; 55-64: $\chi^2= 10.33$, $df= 1$, $p<0.001$; 65+: $\chi^2= 34.28$, $df= 1$, $p<0.001$.

There was a positive association found between being married compared to not married and searching for health information in the last 12 months for all age groups and between living in an urban area compared to a non-urban areas and searching for health information in the last 12 months for all age groups.

There was a positive association between being male and frequency of using the Internet for health information, but only for the 65 and older age group ($\chi^2= 18.95$, $df= 4$, $p<0.001$) and the association was weak. There was also a weak positive association between married compared to not married and frequency of Internet use for health information for the younger boomers ($\chi^2= 11.84$, $df= 4$, $p<0.05$), the 55-64 age group

($\chi^2 = 15.88$, $df = 4$, $p < 0.01$) and the 65 and older group ($\chi^2 = 40.45$, $df = 4$, $p < 0.001$). The results for the older boomers were not statistically significant. Living in an urban area was positively associated with frequency of Internet use for health information for the younger boomers ($\chi^2 = 17.92$, $df = 4$, $p < 0.01$) and the 55-64 group ($\chi^2 = 16.71$, $df = 4$, $p < 0.01$), but the association was weak.

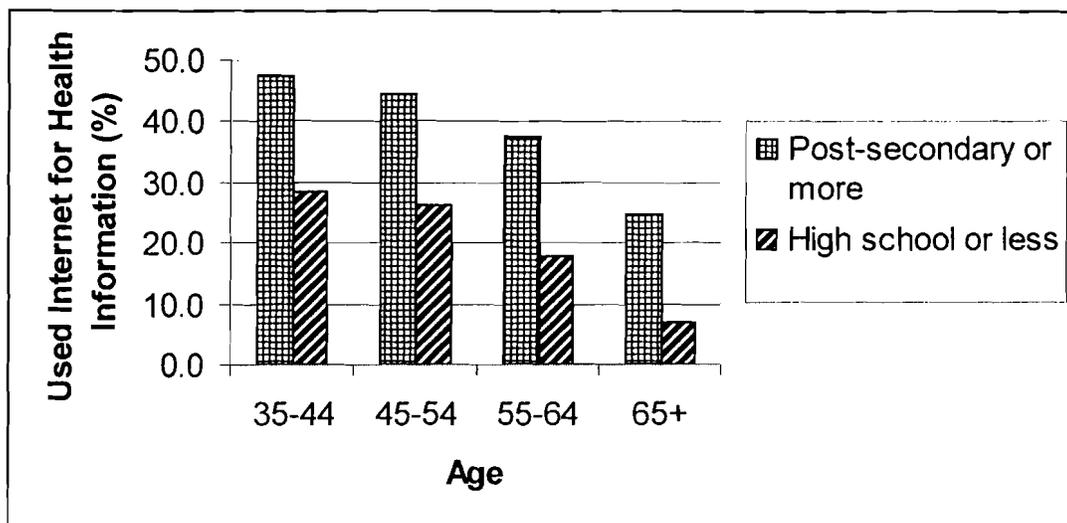
Finding online health information to be useful or very useful was positively associated with being female for the 35-44 group ($\chi^2 = 19.05$, $df = 3$, $p < 0.001$) and was negatively associated with being female for the 55-64 group ($\chi^2 = 10.62$, $df = 3$, $p < 0.05$) and the 65 and older group ($\chi^2 = 16.83$, $df = 3$, $p < 0.01$), although the results were weak. The results were not statistically significant for the older boomers. There was also a weak positive association between being married compared to not married and finding online health information useful for all age groups. Living in an urban area compared to a non-urban area was positively associated with finding health information useful, however this was only the case for the younger boomers ($\chi^2 = 17.74$, $df = 3$, $p < 0.001$) and the 55-64 group ($\chi^2 = 8.19$, $df = 3$, $p < 0.05$). The results for the other two age groups were not statistically significant.

Age Comparisons of Internet Health Information Use by Socioeconomic Status

There was a weak positive association found between having at least a post-secondary education and using the Internet to search for health information in the last 12 months for the boomers and a moderate association for the older age groups (see Figure 6.12). For the 35-44 group, approximately 47% of people with a post-secondary education or more reported using the Internet to search for health information, compared to 29% of those with a high school education or less ($\tau b = 0.18$, $p < 0.001$). The

percentage difference between having a post-secondary education or more and a high school education or less and having used the Internet to search for health information was about 20% (moderate) for each age group, with the 65 and older group having the lowest reported rates, where 25% of those with a post-secondary education had used search for health information compared to 7% of those with a high school education or less (tau b= 0.26, p<0.001).

Figure 6.12: Percentage of people that have used the Internet for health information in the last 12 months by education level controlling for age.

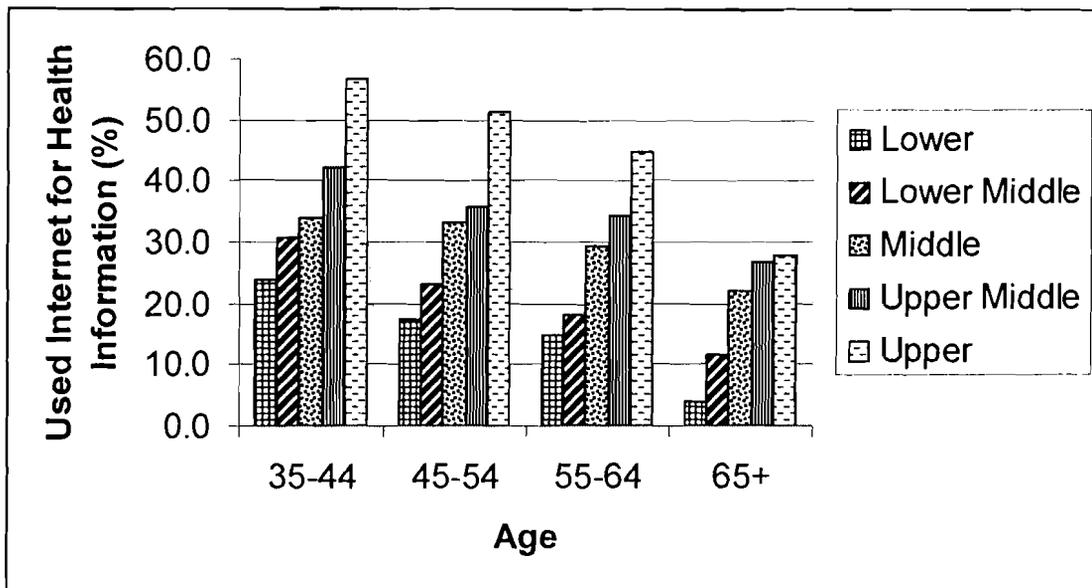


Statistics: 35-44: tau b= 0.18, p<0.001; 45-54: tau b= 0.18, p<0.001; 55-64: tau b= 0.21, p<0.001; 65+: tau b= 0.26, p<0.001.

A moderate positive association was also found between income and using the Internet to search for health information in the last 12 months for all age groups (see Figure 6.13). For the younger boomers, 57% of people in the upper income quintile and 42% in the upper middle income quintile reported using the Internet for health information, whereas 34% in the middle income quintile, 31% in the lower middle and 24% in the lower quintile reported using the Internet for health information (tau c= 0.25,

$p < 0.001$). The oldest age group had the lowest reported rates of using the Internet for health information for all income levels, where 4% of people in the lower income quintile reported using it, while 28% of people in the upper income quintile reported using it ($\tau c = 0.19, p < 0.001$). This supports the hypothesis that socioeconomic status will be positively associated with searching for online health information for all age groups.

Figure 6.13: Percentage of people that have used the Internet for health information in the last 12 months by income level controlling for age.



Statistics: 35-44: $\tau c = 0.25, p < 0.001$; 45-54: $\tau c = 0.25, p < 0.001$; 55-64: $\tau c = 0.24, p < 0.001$; 65+: $\tau c = 0.19, p < 0.001$.

There was also a weak positive association between socioeconomic status and frequency of Internet use for health information for all ages. People with a post-secondary education reported searching for health information more frequently than people with a high school education or less in all age groups ($p < 0.001$) as did people with higher incomes in the 35-44, 45-54 and 55-64 groups ($p < 0.001$) and the 65 and older group ($p < 0.01$). Socioeconomic status was also associated with finding online health

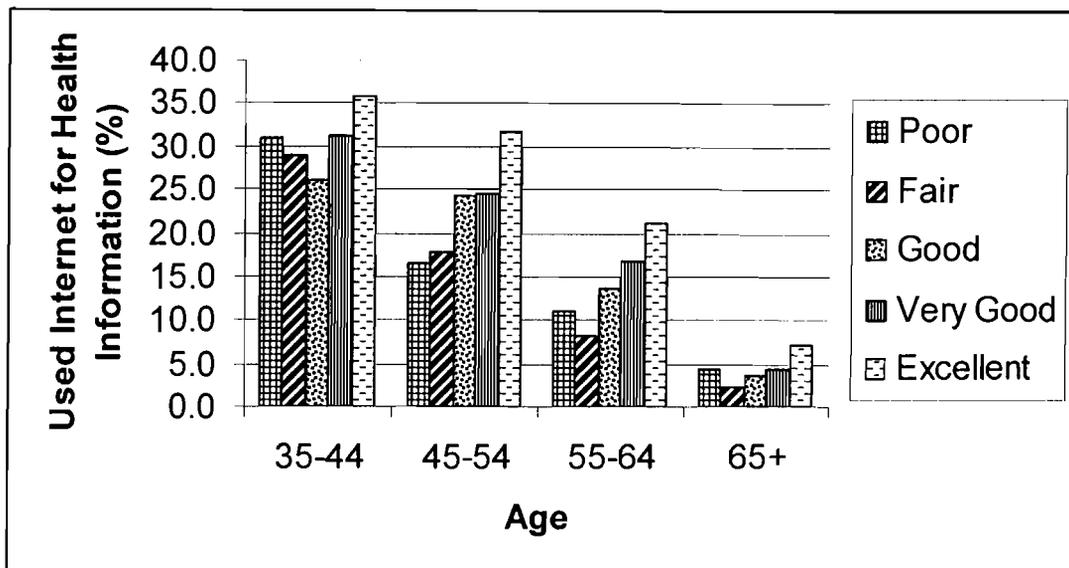
information somewhat or very useful for all ages. For the younger boomers, there was a weak positive association between having a post-secondary education or more and finding online health information useful, where 37% of people with a post-secondary education reported finding online health information to be useful or very useful, compared to 15% of those with a high school education or less ($\tau c = 0.198, p < 0.001$). The results were statistically significant for all other age groups as well ($p < 0.001$). Similar results were found for income, where 15% of younger boomers in the lower income quintile and 23% of those in the lower middle income quintile reported finding online health information useful compared to 47% of those in the upper income quintile ($\tau c = 0.131, p < 0.001$). Results were also weak but statistically significant for the older boomers and the 55-64 group ($p < 0.001$), as well as the 65 and older group ($p < 0.01$).

Age Comparisons of Internet Health Information Use by Health Status

Using the GSS 2000 and controlling for age, there was a weak positive association found between ever using the Internet to search for health information and health status for all age groups (see Figure 6.14). People with a higher self-reported health were more likely to have ever used the Internet to search for health information. For the 45-54 age group, 16% of those with poor health and 18% with fair health had ever used the Internet to search for health information, compared to 24% with good and very good and 36% with excellent health ($\tau c = 0.09, p < 0.001$). Frequency of using the Internet for health information in the last month was also positively associated with health status, however this association was weak for all age groups. This supports the hypothesis that health status will be positively associated with ever searching for health

information and with frequency of health-related searches in the last month for all groups, however the associations were not as strong as expected.

Figure 6.14: Percentage of people that have ever used the Internet for health information by health status controlling for age.



Statistics:35-44: tau c= 0.08, p<0.001; 45-54: tau c= 0.09, p<0.001; 55-64: tau c= 0.08, p<0.001; 65+: tau c= 0.03, p<0.001.

There was a weak positive association between health status and usefulness of online health information for all age groups (p<0.001), where people in better health found online health information to be more useful than those in poorer health.

Barriers to Internet Use by Age Group

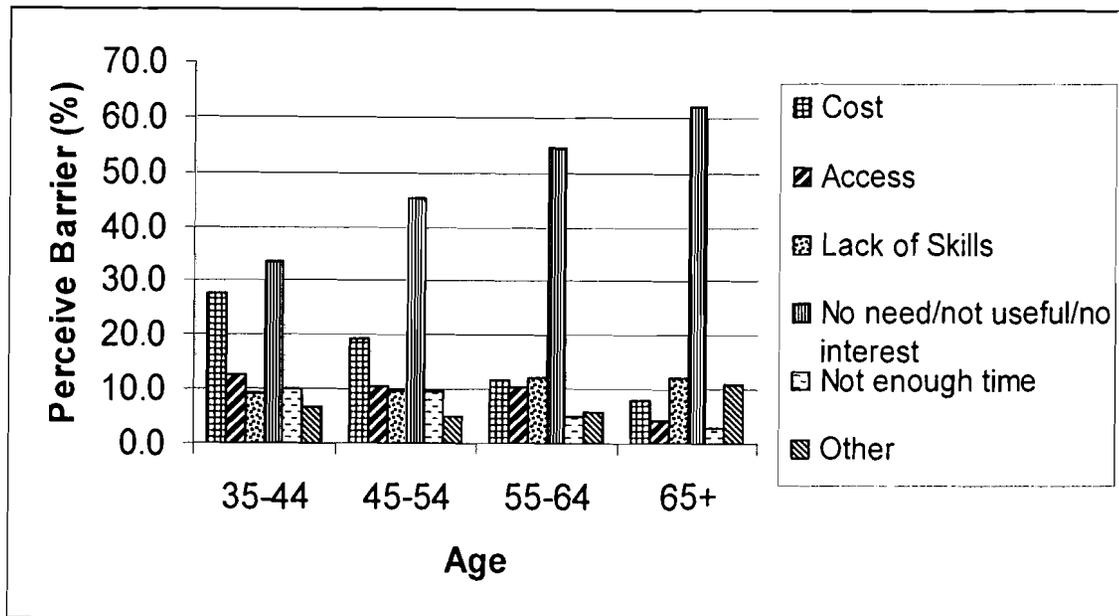
Age Comparisons of Barriers to Internet Use

Only non-users of the Internet were asked about their barriers to using the Internet. Instead of assuming that people who use the Internet do not have a barrier and recoding them as not having the barrier, respondents who use the Internet were left as

missing for this variable in order to get more accurate and applicable responses (n= 10,452/45.2%). Chi square was used because it was treated as a categorical variable.

It was hypothesized that cost, access and lack of skills would be the greatest barriers to using the Internet at home for all age groups. The results show that none of these barriers were ranked first for any age group (see Figure 6.15). The two baby boomer groups had the same barriers ranked from one to four, while there was more variability between the two older age groups ($\chi^2= 988.39$, $df= 15$, $p<0.001$). The greatest barrier for all age groups was no need/not useful/no interest. Approximately 61% of people 65 and older, 55% of those 55-64, 45% of those 45-54, and 34% of those 35-44 reported this as their greatest barrier to using the Internet at home. The second most popular answer for the baby boomers was cost, while access was rated third and not enough time was fourth. For the 55-64 age group and the 65 and older group, the second most popular answer was lack of skills, while cost was third for the 55-64 group, followed by access. For the 65 and older group, the third most popular answer was other (i.e. privacy) while the fourth was cost. The hypothesis was partially supported, since cost and access were rated second and third for the younger and older boomers, respectively, while lack of skills was rated second for the two older groups and cost was rated third for the 55-65 group.

Figure 6.15: Greatest barrier to Internet use at home by age group.

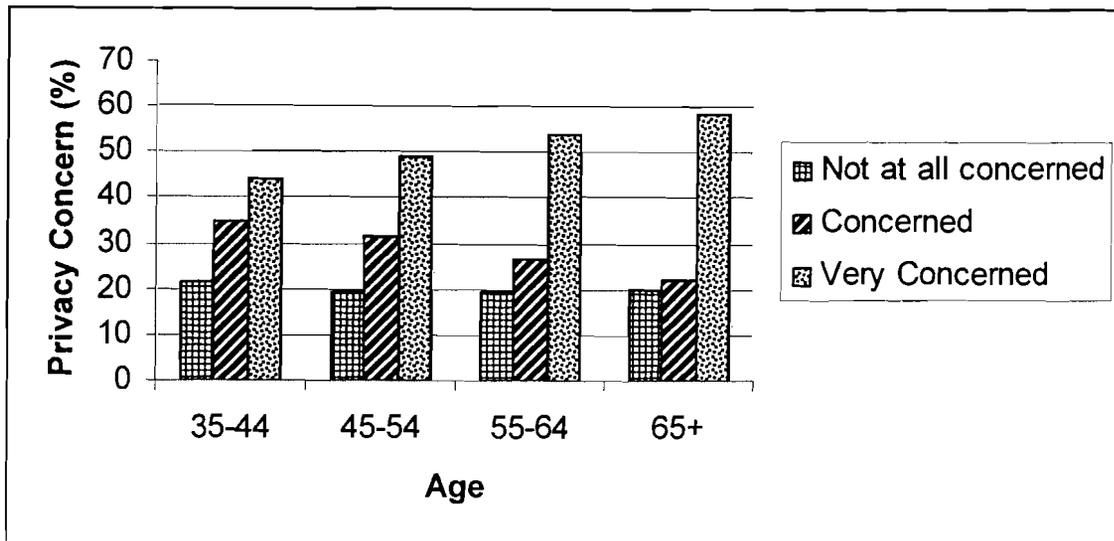


Statistics: $\chi^2 = 988.39$, $df = 15$, $p < 0.001$.

Age Comparisons of Privacy Concerns about Internet Use

There was a weak positive association between age and being very concerned about privacy on the Internet ($\tau c = 0.08$, $p < 0.001$). Approximately 58% of those 65 and older and 54% of those 55-64 reported being very concerned about privacy when using the Internet, compared to 49% of those 45-54 and 44% of those 35-44. Younger boomers reported being somewhat concerned more often than older adults, where 35% of those people 35-44 reported being somewhat concerned, compared to 22% of those 65 and older. The percentages of people who were not at all concerned were about the same for all age groups, ranging between 20 and 22%. The results support the hypothesis that older adults will be more concerned about privacy when using the Internet than the baby boomers, however it was expected that older adults would have reported being concerned more than the younger adults, and that there would be a higher proportion of younger adults who were not at all concerned (See Figure 6.16).

Figure 6.16: Percentage of people concerned about privacy on the Internet by age group.

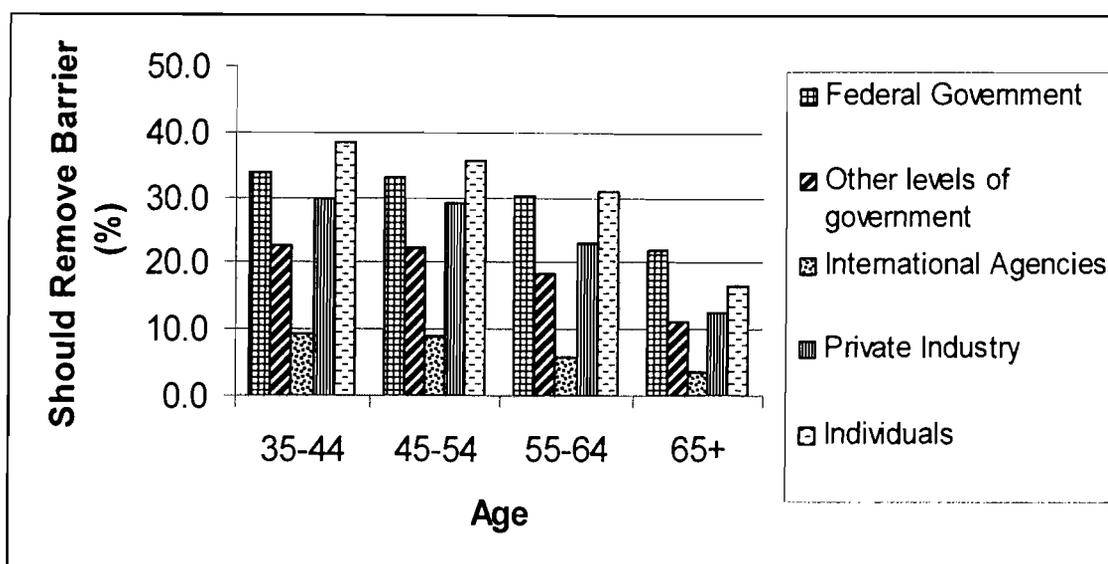


Statistics: tau c= 0.08, p<0.001.

Age Comparisons of Responsibility to Remove Barriers

On the GSS 2000 questionnaire, the question regarding barriers was ‘who should take the greatest responsibility to ensure barriers are removed?’ This variable was crosstabulated with age. The bivariate results are found in Figure 6.17. All of the responses were negatively associated with age, where more baby boomers than older adults believed that it was the responsibility of the various groups listed to remove the barriers. The most common answer for the baby boomers and those 55-64 was that it was the responsibility of individuals to ensure barriers are removed. The most common answer for the 65 and older group was that it is the responsibility of the Federal government; this was the second most common answer for the other age groups. Other common answers were private industry, followed by other levels of government. The least common answers for all age groups were international agencies and ‘other’, while none of the age groups thought that it was ‘no ones’ responsibility.

Figure 6.17: Responsibility for removing barriers to Internet use by age group.



Statistics: Federal government: $\chi^2=188.1$, $df=3$, $p<0.001$; Other levels of government: $\chi^2=251.1$, $df=3$, $p<0.001$; International agencies: $\chi^2=156.3$, $df=3$, $p<0.001$; Private industry: $\chi^2=497.9$, $df=3$, $p<0.001$; Individuals: $\chi^2=618.8$, $df=3$, $p<0.001$; Other: $\chi^2=17.4$, $df=3$, $p<0.01$.

Multivariate Analysis

A logistic regression analysis was performed in order to test a set of hypotheses pertaining to the research questions. Since the purpose of the study was to examine the factors that influence Internet use for health information between baby boomers and older adults, the dependent variable used in the regression analysis was Internet use for health information in the last 12 months (“During the past 12 months, have you used the Internet at home to search for medical or health related information?”). This dichotomous variable (yes/no) was chosen because it represents a good measure of Internet health information use and it narrows the focus of use on the last 12 months. In the original questionnaire, only people who had used the Internet in the past 12 months were asked this question, with the remaining responses (or those who hadn’t used the Internet in the past 12 months) left as missing. For the purposes of this study, those missing responses were

recoded as 'no' (have not used the Internet to search for health information), since they hadn't used the Internet in the past 12 months, we can assume that they haven't used the Internet for health information in the past 12 months.

The independent variables were selected and hierarchically ordered into blocks based on logical sequential order so that the effect of each block could be assessed in terms of its impact on the dependent variable, while controlling for variables in other blocks. By controlling for other variables, we were able to observe the independent effects of each variable. The independent variables were chosen based on the literature pertaining to predictors of Internet use and specifically Internet use for health purposes. Block one included demographic characteristics, including sex (female compared to male), marital status (married compared to not married) and region (urban compared to non-urban). These variables often contribute to socioeconomic factors; therefore block two included the following socioeconomic variables: education (post-secondary education or more compared to high school or less) and income (lower middle, middle, upper middle and upper compared to lower income). Demographic and socioeconomic factors influence a person's attitudes towards using the Internet, and a common issue or barrier among Internet users is privacy. Therefore the third and final block includes privacy concerns about using the Internet (concerned and very concerned compared to not at all concerned). Not all independent variables were included in the model due to problems with colinearity. This was due to the fact that the Internet variables could only be asked of persons who reported using the Internet. The variables were non-independent which caused problems in the standard error and chi square values. The variables that had

to be excluded were barriers to Internet use, Internet use (ever), location(s) of Internet use, length of time since first use of the Internet and frequency of use.

Since the study is focused on age differences between baby boomers and older adults, in order to compare associations across age groups, each age group (35-44, 45-54, 55-64, 65+) was analyzed in a separate regression. The odds ratios are compared across age groups in order to determine patterns. The individual blocks and overall models were evaluated using Model (or Block) Chi Square (χ^2). Although confidence intervals could have been used in this study to compare age differences, or examining percent change in odds ratios between groups, it was decided that the current method is appropriate, given the exploratory nature of this study. See Appendix A for the conceptual model. The complete results of the multivariate analysis are found in Appendix B.

Statistical significance will be represented using the following symbols: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The number of respondents for each age group is as follows: 35-44= 6676 (28.6%); 45-54= 6566 (28.2%); 55-64= 4745 (20.4%); 65+= 5322 (22.8%)

Analysis of Block One

The Model Chi Square for block one was statistically significant across all age models: 35-44 ($\chi^2 = 193$ ***), 45-54 ($\chi^2 = 138.09$ ***), 55-64 ($\chi^2 = 80.78$ ***), 65+ ($\chi^2 = 151.34$ ***). It was hypothesized that baby boomer women would be more likely to use the Internet for health information compared to baby boomer men and those in older age groups. This was true for all age groups except for the 65 and older group, where the association was in the opposite direction. For the younger boomers (35-44), the

likelihood of using the Internet for health information is increased by a factor of 1.48 for females (compared to males) ($B= 0.39$, $S.E= 0.05$, $O.R= 1.48^{***}$). Similar but slightly weaker associations were found for the older boomers (45-54) ($B= 0.31$, $S.E= 0.05$, $O.R= 1.37^{***}$) and for the 55-64 group ($B= 0.27$, $S.E= 0.07$, $O.R= 1.31^{***}$). However, for the 65 and older group, the likelihood of using the Internet for health information is decreased by a factor of 0.77 for females (compared to males) ($B= -0.261$, $S.E= 0.084$, $O.R= 0.77^{**}$). Being married (compared to not married) was also associated with using the Internet for health information for all age groups, but was strongest for the oldest age groups. The likelihood of using the Internet for health information is increased by a factor of 1.73 for the younger boomers ($B= 0.55$, $S.E= 0.06$, $O.R= 1.73^{***}$), by 1.55 for the older boomers ($B= 0.44$, $S.E= 0.062$, $O.R= 1.55^{***}$), by 1.69 for the 55-64 group ($B= 0.52$, $S.E= 0.08$, $O.R= 1.69^{***}$) and by a factor or 2.41 for the 65 and older group ($B= 0.88$, $S.E= 0.1$, $O.R= 2.41^{***}$) for those who are married (compared to not married). Living in an urban area (compared to a non-urban area) of Canada was also associated with using the Internet for health information for all age groups. The likelihood of using the Internet for health information is increased by a factor of 1.55 for the younger boomers who live in urban (compared to non-urban) areas ($B= 0.44$, $S.E= 0.06$, $O.R= 1.55^{***}$). A similar association was found for the older boomers ($B= 0.56$, $S.E= 0.06$, $O.R= 1.58^{***}$) and those 55-64 ($B= 0.39$, $S.E= 0.07$, $O.R= 1.48^{***}$). For the 65 and older group, the likelihood of using the Internet for health information is slightly higher for those living in urban (compared to non-urban) areas ($B= 0.54$, $S.E= 0.1$, $O.R= 1.71^{***}$). See Table 6.1 for the complete results of block one.

Table 6.1: Logistic Regression: Block One

Age Group	Model Chi Square	Block Chi Square	Demographic Variables (reference)	Beta	Standard Error	Odds Ratio
35-44	192.00***	192.00***	Sex- Female (male)	0.39	0.05	1.48***
			Married (not married)	0.55	0.06	1.73***
			Urban (rural)	0.44	0.06	1.55***
45-54	138.09***	138.09***	Sex- Female (male)	0.31	0.05	1.37***
			Married (not married)	0.44	0.06	1.55***
			Urban (rural)	0.46	0.06	1.58***
55-64	80.78***	80.78***	Sex- Female (male)	0.27	0.07	1.31***
			Married (not married)	0.52	0.08	1.69***
			Urban (rural)	0.39	0.07	1.48***
65+	151.34***	151.34***	Sex- Female (male)	-0.26	0.08	0.77**
			Married (not married)	0.88	0.10	2.41***
			Urban (rural)	0.54	0.10	1.71***

*p<0.05

**p<0.01

***p<0.001

Analysis of Block Two

The Model Chi Square was strongest for block two for all age groups. When the socioeconomic variables education and income were added to the second block, the Model Chi Square values increased to 554.52*** for the younger boomers (Block $x^2=361.52$), 581.97*** for the older boomers (Block $x^2=443.88$), 424.94*** for the 55-64 group (Block $x^2=344.15$) and 582.1*** for the 65 and older group (Block $x^2=430.76$). The odds of using the Internet for health information increased even further for females (compared to males) for all age groups, except for the 65 and older group, where sex was

no longer statistically significant. By controlling for the socioeconomic variables, the odds of using the Internet for health information decreased for those married (compared to not married) and for those living in urban areas (compared to non-urban areas) for all ages compared to the first block, although they all remained statistically significant ($p < 0.001$).

It was hypothesized that socioeconomic status would be positively associated with searching for online health information. The results support the hypothesis, showing that the odds of using the Internet for health information are higher for those with a post-secondary education or more (compared to a high school education or less) for all age groups, but this association increased with older age groups. The results for the 35-44 group showed that the likelihood of using the Internet is increased by a factor of 1.83 for those with a post-secondary education or more (compared to a high school education or less) ($B = 0.6$, $S.E = 0.06$, $O.R = 1.83^{***}$). For the 45-54 group, the likelihood is increased by a factor of 1.95 ($B = 0.66$, $S.E = 0.59$, $O.R = 1.95^{***}$). The odds are higher for the older age groups. For the 55-64 group, the likelihood of using the Internet for health information are increased by a factor of 2.2 for those with a post-secondary education or more (compared to a high school education or less) ($B = 0.8$, $S.E = 0.07$, $O.R = 2.2^{***}$). The highest odds were for the 65 and older group, where the likelihood of using the Internet for health information are increased by a factor of 3.33 for those with a post-secondary education or more (compared to a high school education or less) ($B = 1.2$, $S.E = 0.09$, $O.R = 3.33^{***}$).

The odds of using the Internet for health information are also increased for those with higher incomes (compared to lower incomes) for all age groups, which also supports

the hypothesis, however it is strongest for those 65 and older. For the younger boomers, the likelihood of using the Internet for health information is increased by a factor of 2.04 for those with in the upper middle income quintile (compared to the lower income quintile) (B= 0.71, S.E= 0.11, O.R= 2.04***) and by a factor of 3.24 for those in the upper income quintile (compared to the lower income quintile) (B= 1.18, S.E= 0.12, O.R= 3.24***). For the older boomers, the likelihood of using the Internet for health information is increased by a factor of 2.26 for those in the upper middle income quintile (compared to the lower income quintile) (B= 0.81, S.E= 0.13, O.R= 2.26***) and by a factor of 3.86 for those in the upper income quintile (compared to the lower income quintile) (B= 1.35, S.E= 0.13, O.R= 3.86***). For the 65 and older group, the odds of using the Internet for health information are almost 2.5 times higher for those in the lower middle income quintile (compared to the lower income quintile) (B= 0.88, S.E= 0.15, O.R= 2.4***). The odds increase further for those with higher incomes in the same age group, where the likelihood of using the Internet for health information are increased by a factor of 4.06 for those in the middle income quintile (compared to the lower income quintile) (B= 1.4, S.E= 0.16, O.R= 4.06***) and by a factor of 4.9 for those in the upper income quintile (compared to the lower income quintile) (B= 1.59, S.E= 1.9, O.R= 4.9***). See Table 6.2 for the complete results for block two.

Table 6.2: Logistic Regression: Block Two

Age Group	Model Chi Square	Block Chi Square	Socioeconomic Variables (reference)	Beta	Standard Error	Odds Ratio
35-44	554.52***	361.52***	Post Secondary or more (High school or less)	0.60	0.06	1.83***
			Income- Lower Middle (Lower)	0.32	0.12	1.37*
			Income- Middle (Lower)	0.40	0.12	1.49**
			Income- Upper Middle (Lower)	0.71	0.11	2.04***
			Income- Upper (Lower)	1.18	0.12	3.24***
45-54	582.00***	443.88***	Post Secondary or more (High school or less)	0.67	0.06	1.95***
			Income- Lower Middle (Lower)	0.22	0.14	1.25
			Income- Middle (Lower)	0.75	0.13	2.12***
			Income- Upper Middle (Lower)	0.81	0.13	2.26***
			Income- Upper (Lower)	1.35	0.13	3.86***
55-64	424.94***	344.15***	Post Secondary or more (High school or less)	0.79	0.07	2.20
			Income- Lower Middle (Lower)	0.18	0.14	1.20
			Income- Middle (Lower)	0.71	0.14	2.03***
			Income- Upper Middle (Lower)	0.89	0.14	2.43***
			Income- Upper (Lower)	1.24	0.14	3.45***
65+	582.10***	430.76***	Post Secondary or more (High school or less)	1.20	0.09	3.33***
			Income- Lower Middle (Lower)	0.86	0.15	2.35***
			Income- Middle (Lower)	1.40	0.16	4.06***

Age Group	Model Chi Square	Block Chi Square	Socioeconomic Variables (reference)	Beta	Standard Error	Odds Ratio
			Income- Upper Middle (Lower)	1.54	1.67	4.67***
			Income- Upper (Lower)	1.59	1.89	4.89***

*p<0.05

**p<0.01

***p<0.001

Analysis of Block Three

When the privacy concern variables were added to the model, the Model Chi Square values increased to 577.9*** for the younger boomers (Block $\chi^2=23.38^{***}$), 596.38*** for the older boomers (Block $\chi^2=14.41^{**}$), 439.83*** for the 55-64 group (Block $\chi^2=14.9^{**}$) and 648.76*** for the 65 and older group (Block $\chi^2=66.66^{***}$).

When controlling for privacy concerns, the odds of using the Internet for health information increase further for females (compared to males) for the younger boomers. The odds are also increased for those married (compared to not married) for the 65 and older group, whereas they are decreased for the younger boomers and is no longer statistically significant for the older boomers and those 55-64. When controlling for privacy concerns, the odds of using the Internet for health information are increased slightly for those living in urban areas (compared to non-urban areas) for all age groups except for the younger boomers. For education, the odds of using the Internet for health information are increased slightly further for those with a post-secondary education or more (compared to high school or less) for the 65 and older group, whereas the odds are decreased for those in the other age groups. Controlling for privacy concerns also decreases the likelihood of using the Internet for health information for all income quintiles (compared to the lower income quintile) for all age groups.

It was hypothesized that older adults will be associated with being more concerned about privacy when using the Internet than the baby boomer cohorts. The results show that the odds of using the Internet for health information are increased for those who are concerned about privacy on the Internet (compared to not at all concerned) for all age groups except for the 65 and older group, where the odds of using the Internet for health information are decreased for those who are very concerned (compared to not at all concerned). The results for being very concerned (compared to not at all concerned) were not statistically significant for the baby boomers and the 55-64 age group. The likelihood of using the Internet for health information is increased by a factor of 1.37 for those concerned (compared to not at all concerned) for the younger boomers ($B=0.31$, $S.E=0.07$, $O.R=1.37^{***}$). For the older boomers, the odds of using the Internet for health information is increased by a factor of 1.17 ($B=0.15$, $S.E=0.08$, $O.R=1.17^*$) and for the 55-64 group, the odds are increased by a factor of 1.22 ($B=0.2$, $S.E=0.1$, $O.R=1.22^*$). In contrast, for the 65 and older group, the likelihood of using the Internet for health information is decreased by a factor of 0.53 for those who are very concerned about privacy on the Internet (compared to not at all concerned) ($B=-0.64$, $S.E=0.11$, $O.R=0.53^{***}$) which supports the hypothesis. See Table 6.3 for the complete results for block three.

Table 6.3: Logistic Regression: Block Three

Age Group	Model Chi Square	Block Chi Square	Privacy Concern Variables (reference)	Beta	Standard Error	Odds Ratio
35-44	577.89***	23.38***	Privacy- Concerned (not at all concerned)	0.31	0.07	1.37***
			Privacy- Very concerned (not at all concerned)	0.09	0.07	1.10
45-54	596.38***	14.41**	Privacy- Concerned (not at all concerned)	0.15	0.08	1.17*
			Privacy- Very concerned (not at all concerned)	-0.08	0.07	0.93
55-64	439.83***	14.90**	Privacy- Concerned (not at all concerned)	0.20	0.10	1.22*
			Privacy- Very concerned (not at all concerned)	-0.10	0.09	0.91
65+	648.76***	66.66***	Privacy- Concerned (not at all concerned)	0.09	0.12	1.10
			Privacy- Very concerned (not at all concerned)	-0.64	0.11	0.53***

*p<0.05
 **p<0.01
 ***p<0.001

Chapter Seven: Discussion (Part I)

The purpose of this study was to explore the characteristics associated with Internet use for health information; and more specifically, the difference in Internet health information use across middle and older age groups with a focus on baby boomers and older adults. The concept of health was not defined in the questionnaires used in the study; however, it is assumed that respondents considered 'health' to cover physical and subjective dimensions.

Uncovering the factors that influence online health information use is essential in determining user needs and improvements that can be made to the quality and availability of online health information, and is also important in understanding the reasons people do not use the Internet for health information (Cotton & Gupta, 2004). In order to look specifically at Internet use for health information, it was necessary to first explore the factors that influence Internet use in general, including baseline user rates and age-related patterns.

Part I of the discussion explains the results of the study using key literature. Part II of the discussion will examine the theoretical perspectives used to inform the study as they relate to the research findings. The section ends with a discussion of policy issues and recommendations, areas for future research and limitations of the study.

Internet Access and Use Patterns

Age Comparisons of Internet Access and Use

It was hypothesized that baby boomers would be more likely than older adults (65+) to have ever used the Internet and would be more likely to have access to a computer. The results supported this hypothesis in the bivariate analysis, where age was negatively associated with ever using the Internet and having access to a computer. Most baby boomers have used the Internet. In 2005, 84% of the younger boomers and 74% of the older boomers reported ever using the Internet. Baby boomers were also more likely to have used it for a longer period of time than older adults, and to use it more frequently. When Internet technology emerged in the late 1990s, many of the baby boomers were either at the beginning or the middle of their careers (approximately between the ages of 32 and 51 years old) and may have been introduced to the Internet as part of their job requirements. Baby boomer parents might have had more exposure through their children who were learning to use the Internet at school as well. Approximately half of the younger baby boomers had used the Internet for five or more years at the time of study in 2005. Since then, it is likely that many baby boomers have acquired home access to the Internet for personal use. Conversely, with the inception of the Internet, older cohorts were near the end or already finished their careers, some even well into their retirement years, which could have resulted in less exposure to the Internet. Older adults would have had to take it upon themselves to learn, gain access to, and use the Internet, leading to the current situation where many still do not have access the Internet at home. As a result only 26% of those 65 and older reported ever using the Internet at the time of the study in 2005 and only 23% reported using the Internet from home in the last 12 months. If the

baby boomers are associated with higher access to the Internet, they are also likely to use it more frequently. Indeed, approximately 65% of the younger boomers and 56% of the older boomers reported using the Internet at least once a week from home for personal non-business use, compared to 20% of those 65 and older. Internet use has now become the norm in society, and it has come to be expected that people are familiar with its general features for use at school, work and for a variety of personal reasons (i.e. email, news, banking, entertainment, etc.).

Age Comparisons of Internet Access and Use by Demographic Variables

According to Dholakia (2006), males use the Internet more often than females. Some researchers claim that the gender gap in Internet access and use is due to differences in socioeconomic status, such as education and income, since socioeconomic status is correlated with Internet use. Bimber (2000) states that more men than women are employed and have a post-secondary education, although the gender gap is shrinking, since more women than men are now pursuing post-secondary educations. In general, women have lower incomes than men, therefore gender differences in Internet access and use are to be expected (Dholakia, 2006). In contrast, Wasserman and Richmond-Abbott (2005) report that although there may have been a gender gap to Internet access and use in the 1990s, this gap disappeared by the year 2000 and new users of the Internet are women. The results from the present study support the latter findings. Among the baby boomers, slightly more women than men were found to have ever used the Internet and to have access to the Internet, according to the bivariate analysis. Among those 65 and older however, more men than women reported ever using the Internet. This may be a cohort effect, where current older adult women have lower education levels and less work

experience than their male counterparts and are therefore less likely to be interested in or have the opportunity to access the Internet. Men in this cohort are still less likely than both genders in the younger age groups to have used the Internet. Previous studies have not examined gender differences by age, but instead look at the gender gap in general; therefore, the results may not be entirely comparable to this study.

Marital status has been positively associated with access to the Internet, although this topic is not usually studied exclusively and the reason for its association is not clear (Bimber, 2000; Wasserman & Richmond-Abbott, 2006). Similar findings appeared in this study, where married people were more likely to have ever used the Internet than those who were not married. Being married was also associated with having access to the Internet and with frequency of use. People who are married have an increased chance of using the Internet because of their partner. If the partner has a computer or needs one for work, the other partner is exposed to this and as a result might be more inclined to have tried using it or even use it regularly. Married people can also teach each other how to use the Internet. Since older people are less likely to use the Internet, older married couples will be less likely to use it compared to younger married couples. Therefore, people of any age that are not married may not have the same exposure, access or resources as married people which could explain why user rates are lower among this group.

In this study, living in an urban area was positively associated with Internet access, use and frequency of use for all age groups; although the proportion of people who have access to and use the Internet in urban or rural regions decreased with age. Living in a rural compared to an urban area can sometimes act as a barrier to Internet use. This could be due to limited economic resources, as living a rural area is associated with

socioeconomic status, or it could be due to a lack of quality Internet providers in rural districts (Wasserman & Richmond-Abbott, 2005).

Age Comparisons of Internet Access and Use by Socioeconomic Variables

It is widely known that Internet use is associated with socioeconomic status. Multiple studies in the US have determined that education and income are strongly related to Internet access and use (Cain et al., 2000; Kaiser Family Foundation, 2005; US Department of Health and Human Services, 2006). Race and ethnicity have also been identified as determinants of Internet access and use (Kind et al., 2005), although these variables were not examined in the current study due to limitations in the original questionnaire. The digital divide that occurs when people have unequal access to the Internet due to socioeconomic disparities was identified in this study. For each age group, education and income were positively associated with ever using the Internet, access to a computer and frequency of Internet use in the bivariate analysis. Not surprisingly, rates of utilization were the lowest for the 65 and older group, however the percentage difference was still statistically significant between education levels. The associations were even stronger for income. The results suggest that the digital divide also exists in Canada and that a lower socioeconomic status puts people at a disadvantage when it comes to accessing and using the Internet compared to those with higher incomes and levels of education. We can also conclude that even though age is negatively associated with Internet use, the digital divide still exists among older people. If older adults are considered to be at a disadvantage compared to younger adults when it comes to Internet use, then older people in a lower socioeconomic bracket are even more disadvantaged

than their more educated and higher income counterparts, given that they have the lowest rates of use and access than anyone.

Age Comparisons of Internet Use by Health Status

Most studies regarding Internet use and health status are specifically related to using the Internet for health information. Goldner (2006) points out that before looking at Internet health information patterns it is important to look at how health status influences Internet use in general (i.e. for all types of activities). According to the Pew Internet and American Life Project, about half the people with a chronic disease or disability go online, compared to about three quarters of those with no chronic condition (Fox, 2007). People with chronic conditions may not be physically able to use the Internet due to the limitations caused by their illness. The differential may also be related to socioeconomic factors. According to Fox (2007), "People with chronic conditions are likely to be older and less educated than the general population" (p9). Frequency of Internet use as it relates to health status has not been examined extensively in the literature (Goldner, 2006). In the current study, the association between health status and Internet use was examined. Health status was associated with using the Internet in the last 12 months for all age groups. That is, people in better health were more likely to have used the Internet compared to those with poorer health. The lowest utilization rates were for older people with poorer health. More baby boomers in poor health had used the Internet in the last 12 months than those people 65 and over with excellent health (except for the 55-64 group where the rates were the same). This is probably because older adults are more likely to suffer from chronic conditions. This is compounded by the fact that older adults are less likely to use the Internet. Health status was also associated with having access to a

computer and with frequency of Internet use. Getting access to the Internet might be difficult for someone with mobility problems or who is bed-ridden, especially if there is no access at home. Learning how to use the Internet for the first time or using it regularly might not be a priority to someone who has their health to think about. Since the Internet can be costly and since people who have a chronic condition may have hospital bills, equipment and services to pay for, these people may not be able to afford it. As pointed out in other studies, socioeconomic indicators such as income and education could also be underlying factors fuelling the problem.

Internet Health Information Use Patterns

It is important to understand who is likely to use the Internet for health information as well as ways that Internet health information is used, in order to understand how it can influence health care and ways in which it might be improved. A discussion of online health information use patterns and its relation to age, demographics, socioeconomic status and health status variables will help untangle myths and realities surrounding this increasingly popular health promotion tool in an attempt to make it more accessible and useful for a larger audience.

Age Comparisons of Internet Use for Health Information

Middle-aged adults are more likely to have used the Internet for health information compared to both older and younger people (Ybarra & Suman, 2005). The authors relate this to not only the growing health concerns of middle-aged adults, but also to the caregiving responsibilities that many people have for their aging parents. Another study found that people 75 and older were far less likely to use the Internet for health

information compared to younger people (Baker et al., 2003). In a 2005 survey, the largest category of respondents indicating use of the Internet for health purposes was in the 25-35 age range, followed by those 45-54 and 36-44, respectively (Sillence et al., 2007). Cotton and Gupta (2004) also report strong age differences between online and offline health information seekers, with older adults using online sources of health information less often. Rice (2003) reported that those who started using the Internet earlier are also more likely to use the Internet for health information. Recall in the current study that baby boomers were more likely to have used the Internet for 5 years or more compared to older age groups.

As hypothesized, the current study reveals similar associations between age groups and Internet use for health information to those found in the literature. The baby boomers were more likely to have used the Internet for health information in the last 12 months compared to people 55 and older. Baby boomers also use the Internet for health information more frequently, since Internet use for health information increases with Internet use (Rice, 2006). It is not surprising then that the boomers also find health information on the Internet more useful than older cohorts. It could be that since they use it more frequently, they have more experience and are better able to find what they need, leading to greater satisfaction. Or they use it more frequently because they find the information useful. The difference could also be related to health knowledge, where more baby boomers find the information useful because they understand it better and can put it to use. Lemire et al. (2008) found that the main factor associated with use of a particular health site was perceived usefulness; the more useful it is perceived the more people will use it. Even though the relationship between perceived usefulness and age is clear from

the results of this study, the number of people who perceive online health information as useful is still low. Close to three quarters of the baby boomers do not find online health information useful. Satisfaction of Internet health sites is an area that needs to be examined in more detail. It could be that Internet health sites are not meeting the information needs of the users and that changes need to be made.

Age Comparisons of Type of Internet Health Information

The GSS 2000 questionnaire included information on the type of health information that people commonly searched. This provided an opportunity to examine the type of health information searched within various age groups. Of the people who use the Internet for health information, the most common type of search for all age groups was specific diseases (between 59-64% of each age group reported searching for this type of information), although the results were not statistically significant for age differences. These patterns are similar to the Pew Internet and American Life project findings, where 93% of online health seekers reported searching for information on specific conditions (Fox & Rainie, 2002). Since disease and illness become more prominent in mid-life, it is not surprising that the respondents (many of who are in the mid-life stage) would be most interested in this type of information, since they are all entering, currently in, or beyond mid-life. Similarly, searching for information on symptoms was also more common among the baby boomers than older adults. The reason for this may be that baby boomers are experiencing these symptoms for the first time, whereas older adults may have already had their symptoms examined and have either come to terms with them or have medications to manage them. In fact, 29% of older adults reported searching for information on drugs and medications compared to 19% of the younger boomers and

21% of the older boomers. This supports the notion that health information needs to be relevant to the users.

Although people generally go online to search for information for themselves, many people also search for health information for others (Sillence et al., 2007a). For baby boomers, it could be that they are searching for information about a disease they have been diagnosed with, looking up symptoms they have been experiencing (i.e. stiff joints caused by arthritis), or they may be looking for information that could help them care for an aging parent with an illness (i.e. Alzheimer's Disease). In their study, Sillence et al. (2007a) found that 66% of respondents reported using the Internet to search for information for themselves, while 15% said they go online on behalf of someone else. Another 20% said they were looking for information for both themselves and someone else. Among the most frequent topics that people reported searching for, several diseases ranked in the top 10, including arthritis, cancer, depression and diabetes. Other common topics included fitness, diet, alternative therapy, and women's health (Sillence et al., 2007a).

Although some baby boomers have started to experience symptoms of disease due to aging, they are also known for being conscious of their health and motivated to lead healthy lifestyles (Gilbert, 2000). It was expected that baby boomers would be associated with searching for lifestyle information more than older adults, however the results were not statistically significant. One possible explanation could be that at the time of the study in 2000, the Internet was not as resourceful as it is now and baby boomers were finding information on lifestyle elsewhere. Lifestyle information can include information on diet, exercise, and many other aspects of health promotion. Increasing knowledge in

this area has the potential to improve the overall health of the population; however there are still close to 75% of people (in all age groups) that are not searching for this type of information, which doesn't even include the non-users of Internet health information. Unfortunately, the results show that more people are looking for information on diseases than they are on lifestyle, indicating that people are taking a reactive approach to health, rather than a proactive one. However, with some improvements to the way Internet health information is accessed and delivered, this association could be reversed.

Age Comparisons of Type of Internet Health Sites

The 2000 GSS also included a question on the types of sites that people commonly use for health information. The most commonly reported site for all age groups was Health Canada, with older adults reporting slightly higher rates than the baby boomers. The popularity of this government site might have to do with trust; people assume that information provided by the government is going to be accurate and reliable. Similarly, other government sites were reported more often by the baby boomers. It is clear then that baby boomers and older adults prefer to look for health information from trusted sources such as government sites. These results are in contrast to the findings of Sillence et al. (2007a), where 6% of respondents reported using government websites in 2000, however a breakdown of usage by age was not included in the analysis.

In the current study, the results were also statistically significant for the use of commercial sites (i.e. drug companies), where baby boomers were more likely to use these sites compared to older adults (34% vs. 24% respectively). This may reflect the fact that baby boomers tend to trust information found on the Internet more than older adults (Kaiser Family Foundation, 2005) meaning that they would be more likely to use a site

that has fewer credentials and is more profit-based. According to Sillence et al. (2007a), retail sites tend to contain specific information (which may be more relevant), however there are more trust issues associated with using these types of sites (i.e. advertising gimmicks).

Overall there were few clear patterns on types of Internet health sites used based on age. This may be because once people are online, their preferences for health sites are more similar for the most part. In other words, once the non-users (of Internet health information) have been filtered out, online health-seeking behaviour (in terms of preferences for types of sites) becomes more homogenous and age differences are less apparent (selection bias).

Age Comparisons of Internet Use for Health Information by Demographic Variables

Baby boomer women were associated with using the Internet for health information in the last 12 months more than baby boomer men, which supports the hypothesis. This was true for both the bivariate and the multivariate analysis. According to the bivariate analysis, frequency of Internet use for health information was only statistically significant for the younger boomers and the 65+ group. Younger female boomers were associated with higher frequency of use, while frequency of use was negatively associated with older females (65+). Sillence et al. (2007a) found that women use the Internet for health information more often than men, although their study did not look at age differences. Similarly, Baker et al. (2007) found that the odds of men using the Internet for health information were about half of those for women. Ybarra and Suman (2005) found that the average Internet health information seeker was 46 years of

age and female, and has other distinct qualities such as being white and comfortable using the Internet. Due to their stage in life, baby boomers often find themselves caring for their own children and for their aging parents; a particularly common case for women. According to Fox and Rainie (2000) more than half of people that look for online health information do it on behalf of someone else. This could help explain why baby boomer women are more likely to have used the Internet for health information than men and older adults; they are looking for information that will help them as a caregiver. Women also use more health services and tend to be the decision-makers regarding family health issues (Pandey et al., 2003), therefore the Internet could act as a key resource for health information among women. Pandey et al. (2003) also found that women who have time restrictions in their day-to-day lives tend to use the Internet for health information more than women who are not as busy. With more women working full time in addition to caregiving responsibilities, it is expected that more women are going online (and will continue to go online) for health information. They also found that health needs and the cost of health information act as motivator for women to use the Internet as a supplemental source of information. Since women are slightly more likely to have ever used the Internet, it is not surprising that more women than men find online health information to be useful.

In the Pandey et al. (2003) study, age had a small but statistically significant effect on Internet use for women. This is consistent with the findings in the bivariate analysis of the current study, where women 65 and older were less likely to use the Internet for health information than younger women. This might be related to access, health status, knowledge or socioeconomic factors that put them at a disadvantage

compared to other women which overrides the fact that older women have more health needs. It could also have to do with the time restriction factor reported by Pandey et al. (2003). In the multivariate analysis, the likelihood of using the Internet for health information was decreased for females 65 and older compared to males 65 and older in the demographic block. However, after controlling for socioeconomic variables, gender was no longer statistically significant for this age group. Therefore, for the baby boomers, females are more likely to have used the Internet for health information than males, however for the 65 and older group, the inclusion of socioeconomic factors in the model explains away the original association between gender and Internet use for health information. Based on the results, men 35-54 are less likely to have used the Internet for health information than women, however men and women 65 and older are the least likely to have used it. Targeted strategies to increase utilization rates by both men and women of all ages would be beneficial in increasing health knowledge since frequency rates are still low (even for women).

Similar to general Internet use, being married was positively associated with using the Internet for health information in the last 12 months for all age groups. In the multivariate analysis, after controlling for socioeconomic and privacy variables, being married compared to not married increased the odds of using the Internet for health information; however, this was only the case for the younger boomers and 65 and older group. It could be that married people in these age groups have more social support, are happier and healthier, therefore they are more likely to look for information that would improve their health or the health of their partner. The results were not statistically significant for the other two age groups, meaning that the original association is

explained away by the inclusion of socioeconomic variables (for those 45-54) and privacy variables (for those 55-64) in the model. The reason for the lack of statistical significance for these age groups is not clear. In the Pew Internet & American Life Project, older, unmarried women were the least likely group to use the Internet (Fallows, 2005) so it can be expected that they also use it for health information less often than younger married women. Special attention needs to be paid to increase access and use among unmarried people, especially those who experience other disadvantages such as older women or people with lower socioeconomic status.

Living in an urban compared to a rural region increases the likelihood of using the Internet for health information for all age groups, even after controlling for all variables in the model. This is consistent with the findings on general Internet use and region, where people living in rural regions were less likely to use and have access to the Internet. The association was the strongest for the 65 and older group. Since people living in rural and remote regions may not have access to health care services and programs where they can get health information, the Internet could be particularly beneficial in terms of filling the health knowledge gap for people in these areas.

Age Comparisons of Internet Use for Health Information by Socioeconomic Variables

The results from the bivariate and multivariate analysis show that those with higher educations and incomes were more likely to have used the Internet for health information in the last 12 months compared to those with lower educations and incomes. This is consistent with several studies that support the concept of the digital divide. Obviously if people do not have access to the Internet, they will not be able to access

online health information either. Rice (2003) reported that those with higher levels of education and greater incomes are more likely to be Internet users and to be health information seekers in particular. Other studies have found that there is a strong relationship between higher education levels and Internet use for health, however they did not find the same relationship with income (Kind et al., 2005; Baker et al., 2003). Gilmour (2007) reported that disparities in online health information access and use are related to income, education and ethnicity. Cotton and Gupta (2004) found that the main differences between people that search for online health information (compared to offline health information) was related to education, income and age, where older people with lower education and income levels were less likely to use the Internet for health information. It is apparent then, that there are inconsistent findings on which socioeconomic factors are the most important ones to focus on when it comes to reducing the digital divide. However, in the current study, education and income were the main socioeconomic variables examined.

The socioeconomic block was the strongest block in the logistic regression model, indicating that these variables have the largest impact on Internet use for health information compared to other variables in the analysis. Education and income were strongly related to Internet use for health information for people of all ages. The likelihood of using the Internet for health information in the last 12 months was increased by a factor of almost 2 for those with a post-secondary education or more (compared to high school or less) for all ages except the 65 and older group where the association was even stronger (3.4). For the younger boomers, the odds of using the Internet for health information are increased by a factor of almost 1.5 among those in the middle income

quintile compared to those in the lower income quintile. The strength of the association increases dramatically with higher incomes, showing that those in the lower income quintile are seriously disadvantaged compared to those with even slightly higher incomes, let alone those with much higher incomes. The association is even stronger for the two older age groups suggesting that income and education as barriers to Internet use are magnified in older age and that the digital divide is even stronger for older adults. According to the bivariate results, older people with lower incomes and education levels are the least likely to have used the Internet for health information in the last 12 months.

Once people have access to the Internet, the digital divide for health information subsides (Brodie et al., 2000). In other words, use of the Internet for health information should be similar regardless of income, education, or age, once people are online. In order to get more people using the Internet for health information, the inequalities related to Internet access and use (i.e. education and income) need to be addressed first.

Age Comparisons of Internet Use for Health Information by Health Status

Using the 2000 GSS in the bivariate analysis, it was found that health status was positively associated with ever using the Internet for health information and with frequency of use for all age groups. There is conflicting data on this association, where other studies have found the opposite association. According to some findings, people who report worse health status are more likely to use the Internet for health information (Baker et al., 2003; Goldner, 2006). This supports the health needs model of Pandey et al. (2003) which proposes that women may turn to the Internet when they are faced with an illness and want more information. Moreover, Goldner (2006) reported that people in

poorer health are more frequent visitors of online health sites, although they generally have less access to the Internet.

The findings in this study were more consistent with those of Cotton and Gupta (2004), where they found that people who search for online health information generally have higher a self-reported health status than those who do not go online for health information. The direction of this association is not clear. People who go online may be more capable of using the Internet since they are healthier; however they may be healthier because they are more concerned about their health and are more likely to take preventive health measures such as going online for health information. The latter supports the health and wellness model of Pandey et al. (2003) which proposes that women who are health-conscious are more likely to turn to the Internet for health information in order to foster their health. In this model, use of the Internet for health information is seen as a pro-active approach to health. This could be related to the general population as well (not just women), which would help explain the findings of this study. Whether it is the desire to maintain health or simply the ability to use the Internet, the results indicate that certain factors override the need for health information among those in poorer health. People with better health were also associated with finding online health information useful; an encouraging result suggesting that online health information may be having a positive effect on their health status.

There could be other factors underlying this association, such as socioeconomic factors, since we know that people with lower income, lower education levels and people in minorities generally have poorer health and are also less likely to use the Internet (Goldner, 2006). Health status could not be incorporated into the multivariate analysis

because the 2005 data set did not include it as a variable in the questionnaire. However, the bivariate results do support the hypothesis that health status will be positively associated with ever searching for online health information and with frequency of use for all age groups. If this is the case then efforts need to be made to make the Internet more accessible for those people who have poorer health status and may be restricted from using the Internet. If more people with a health condition could use the Internet it could promote self-care through increased knowledge and perhaps even better health outcomes. As the baby boomers get older, develop illnesses and have more health concerns, it will become increasingly important to get them to take advantage of the Internet for their health information needs, regardless of their health status. Encouraging them to use it now while many of them are healthy will increase the chances of them using online health information as they age.

Barriers to Internet Use by Age

Age Comparisons of Barriers to Internet Use

Barriers to Internet use could only be examined in the bivariate analysis. The greatest barrier to Internet use at home for non-users of the Internet was no need/not useful/no interest. This was an unexpected result, as it was hypothesized that cost, access and lack of skills would be the greatest barriers to Internet use, since these are closely related to the digital divide. This is consistent with the findings of Silence et al. (2007a) where they found that the main reason for non-use was related to lack of need. Cost was ranked second among the baby boomers, while lack of skills was ranked second among the two groups of older adults. Access was ranked third among the baby boomers, while cost was ranked third for those 55-64 and other (i.e. privacy) was third for those 65 and

older. Not surprisingly, lack of skills was not ranked as high for the baby boomers as it was for older adults, since they have more experience using the Internet, while not enough time was ranked low as a barrier to older adults, since many of them are retired and have fewer responsibilities than they once did.

These finding presents some interesting challenges. If non-users of the Internet do not perceive a need to use the Internet, it's going to difficult to convince them to use an unfamiliar medium such as the Internet for health information. Perhaps they are happy with their current level of health knowledge or satisfied with their current source for health information. On the other hand, they may not know that the Internet can be very resourceful for retrieving health information. This finding highlights the need to increase awareness on the value of the Internet for health information, particularly targeting non-users of the Internet who have the attitude that there is no need or have no interest or that the Internet is not useful. If we can dispel these myths or change these people's attitudes it opens the door for increasing health knowledge among those people who could benefit the most.

Age Comparisons of Privacy Concerns and Internet Use

As hypothesized, the bivariate analysis showed that age is positively associated with being very concerned about privacy on the Internet. However, this doesn't mean that baby boomers are not concerned about privacy. In fact, the baby boomers reported being concerned more than older adults. Similarly, it does not mean that all older adults are very concerned. The percentage of people that were not at all concerned was approximately the same for all age groups. That baby boomers are concerned should not be taken as a negative finding. Having some concern about using the Internet can actually

be a good thing because it means that people might be more careful when it comes to giving personal information or taking advice from sources that are not credible. Being too concerned however, could lead to people being fearful or hesitant towards using the Internet.

Privacy was added to the third and final block of the multivariate analysis to see how it affects Internet use for health information. The results were similar to those in the bivariate analysis, except for the response for the 55-64 group, which was more similar to the baby boomers than those 65 and older. It was found that the likelihood of using the Internet for health information in the last 12 months is increased for those who are concerned (compared to not at all concerned) for all age groups except those 65 and older. This supports the notion that being concerned about privacy does not necessarily deter people from using the Internet (for health information in particular) and can actually be positive. There could be several explanations for this. For example, it could be that the effects of privacy concerns are working in the opposite direction for these age groups. In other words, instead of privacy concerns affecting their Internet use, their internet use could be affecting their privacy concerns, and as a result they just use sites that they have confidence in.

For the 65 and older group, the opposite association was found. The likelihood of using the Internet for health information was decreased for those very concerned (compared to not at all concerned). Adults over 65 have been associated with having more concerns about privacy on the Internet than younger people (Kaiser Family Foundation, 2005). It is understandable that if someone has less experience with something they are going to be more apprehensive about it. Knowledge can help alleviate

this problem. If more older adults knew how to use health information on the Internet responsibly, such as knowing how to identify sites where their privacy might be compromised, it might help put their concerns at ease. Teaching baby boomers now about privacy and how to be careful on the Internet will help ensure that this will not act as a barrier to accessing online health information in the future.

Although privacy is a concern for Internet users, another useful measure of security would be trust. The amount of trust that people put into information on the Internet (especially health information) is an area that needs to be examined. Something to consider is that if trust and privacy are associated, (and since there were similar proportions of people of all ages that were not at all concerned about privacy), it means that there needs to be more efforts to ensure that all users (not just certain age groups) are not overly trusting of online health information.

Age Comparisons of Responsibility for Removing Barriers

Using the 2000 GSS data, it was discovered that the baby boomers and those 55-64 believe that it is the responsibility of individuals to remove the barriers to Internet use, whereas those 65 believe that it is the responsibility of the federal government. Since the baby boomers and those 55-64 use the Internet more than older adults, they might be biased towards this question, since they starting using the Internet without encouragement from the government. Even still, a proportionately high number of people of all ages thought that the federal government should take responsibility to ensure barriers are removed. Private industry and other levels of government were also more common answers.

Depending on the type of barrier, different agencies should take responsibility. For example, when it comes to cost and access, these are fundamental barriers that should be addressed at the government level in the form of reduced Internet fees (i.e. start-up costs) for low-income families, more public computer sites in communities and subsidies for those people that use the Internet for health purposes. In terms of lack of skills, various levels of government could collaborate with private industry (i.e. Internet providers) to ensure that people have the proper skills to be able to use the Internet by providing subsidized classes on using the Internet. It is also up to the government to promote Internet use through promotional campaigns that show how the Internet can be beneficial for increasing health knowledge. This would help attract the attention of those people who claim they are not interested, and have no need or interest in using it. The responsibility cannot all be put on the individual if the digital divide is ever going to be removed. As long as cost, access and lack of skills are present as barriers, using the Internet will continue to be a privilege as opposed to a right.

Discussion (Part II)

Theoretical Perspectives

Life Course Framework, Health Information and the Internet

In order to increase the amount of people that turn to the Internet as a source for health information, the problem of Internet access and use needs to be addressed. The people who are the least likely to use the Internet are also the ones who are the least likely to use the Internet for health information and therefore are at a disadvantage when it comes to health knowledge and health outcomes (O’Rand, 1996). The results from this study indicate that access and use is particularly low among those 65 and older, older women, people that are not married, people living in rural areas, people with lower levels of education and income and people with poorer health status. According to the life course framework, these subgroups may have had different life experiences than their counterparts which have put them at a disadvantage when it comes to accessing health information (the result of cumulative disadvantages) as shown by the lower rates of Internet access and utilization (Quadagno, 2005). These earlier experiences may affect self-care practices such as health information seeking behaviour, or lower self-efficacy leading to decreased motivation to change behaviours (Bandura, 1977). Socioeconomic factors in particular are known to play a large role in health outcomes, especially later in life (House et al., 2005) which can be seen by the lower online health utilization rates among those with lower education and incomes. The inequalities in this case are manifested through lower health knowledge and thus, poorer health outcomes. Within

these subgroups, the baby boomers are still more likely to use the Internet than older adults which could be explained by cohort effects (i.e. higher education levels than previous generations), however divergence within a cohort leads to certain subgroups facing more inequalities than others (Dannefer, 2003). There is still much diversity within the baby boomers, therefore there is not a one-size-fits-all solution to health promotion strategies for this generation.

The Role of Self-Efficacy in Perceived Usefulness of Health Information

When it comes to using the Internet for health information, the results were very similar to those for Internet use, across age and within the same subgroups mentioned earlier (although in lower proportions), reinforcing the fact that Internet use in general is at the heart of the problem. Use of the Internet for health information needs to increase across all ages (and subgroups), which is evident by the fact that less than half of people in each age group reported using the Internet for health information in the last 12 months. Perceived usefulness was low across all age groups as well, however it was higher among those people that are more likely to use the Internet, indicating that once people start to use it, they become more familiar with it (and perhaps more skilled at searching) and tend to be more satisfied with the information they find; another reason why it is important to increase access and use of the Internet. Perceived usefulness is also related to the concept of self-efficacy and self-care. If the information presented is difficult to understand, confusing or daunting, this is going to have a negative effect on self-efficacy, resulting in decreased confidence to carry out a particular action or meet health goals (Bandura, 1977). In contrast, if a person feels like they can take on a behaviour successfully, this will have a positive effect on self-efficacy, promoting self-care in the form of improving

their health and well-being (Kickbusch, 1989) and in the context of this study, continuing to use online health information. The people in the latter situation are more likely to report information as being useful.

The Impact of Health Knowledge on Self-Care

Although the outcomes of using online health information were not examined in this study, previous research supports the notion that people who use online health information are more confident in their health knowledge, have increased feelings of social support and identity and that they appreciate being able to explore other options (Sillence et al., 2007b). Online health information users have also reported better well-being, health status and general happiness (Cotton & Gupta, 2004). In some cases it has even allowed them to better care for themselves or at least communicate more efficiently with health care providers (Baker et al., 2003). These findings also support the idea that health knowledge can increase a person's confidence, motivation and likelihood of practicing self-care; all of which can lead to better health outcomes (Chou & Wister, 2005; Kickbusch, 1989; Bandura, 1977). It is the hope that by increasing health knowledge at this point in the life course, that baby boomers will continue to take an interest in their health as they age.

Targeted Health Information as a Cue to Action

The results from the study also point to the importance of targeted health information. Age groups were shown to have different preferences in terms of online health content, meaning that the information needs for one group of adults is not necessarily going to be relevant to another. Health Canada sites were the most popular

sites visited among users of online health information, however, given the low rates of utilization of online health information across all age groups, it indicates that there is room for improvement on these and other types of health information sites. Strategies to promote online health information as a source for health information need to pay special attention those subgroups who are also least likely to use the Internet (and the Internet for health information) (i.e. lower education, income, health status, older females, etc.) and cater to their needs. Health information can act as a powerful cue to action and can affect health behaviours (Chou & Wister, 2005; Rosenstock, 1974), therefore appropriate and relevant cues need to be presented to targeted audiences in order to have the greatest impact. For example, results from this study show that older adults are more interest in information on medications than baby boomers, while baby boomers have a greater interest in information on symptoms. Information such as this can be used to create targeted cues to action, instead of assuming that all adults have the same health interests and needs.

Perceived Barriers and the Health Belief Model

From the study it was found that biggest barrier to Internet use for non-users was no need/not useful/no interest. Although this question was not specific to health information, it could help explain why the number of people who use online health information is so low. If the non-users were to be enlightened on the benefits of online health information (as just one of the benefits of the Internet) and given the opportunity to try using it, this might help eliminate or at least reduce this barrier. Therefore it can be argued that the biggest barrier according non-users is not an issue of inequality in terms

of cost or access; instead, it is a knowledge barrier (i.e. they may not be aware of the extent of its usefulness).

In the health belief model, health behaviours are influenced in part by perceived benefits and barriers involved in changing one's behaviour and the perceived susceptibility of the health problem. According to the results, the largest barrier to Internet use relates to both of these elements. First of all, many perceive their lack of need/interest as a barrier, and second of all, this lack of need/interest could indicate that they do not perceive themselves as susceptible to a health problem. If in fact barriers to Internet use in general are synonymous to the barriers to Internet use for health information, then changing these beliefs needs to be part of the strategy. These beliefs might be indicative of other poor health habits such as smoking, inactivity and unhealthy eating. Marketing campaigns, educational programs and employee workshops are examples of ways that might help increase knowledge and awareness of health issues in an attempt to change people's beliefs.

In addition to the knowledge barrier, equality issues (i.e. cost and access) were also identified as barriers, and are evident by the digital divide revealed in this and other studies. Both knowledge and equality are barriers that need to be addressed through policy and collaboration between various organizations involved in health promotion. According to the results from this study, people feel that the responsibility for removing barriers does not belong to just one group. Individuals are required to take some responsibility, realizing that the choices they make can have important repercussions later on (life course framework); however the government must also play a role in reducing disparities that take away the choices people have. Using health promotion as a platform

(cue to action) for increasing Internet access and use is one way to get the attention of non- and infrequent Internet users (and perhaps change their beliefs), since health is a relevant topic to everyone.

Policy Issues and Recommendations

Now that the Internet is becoming more popular as a resource for health information, it should also be considered a part of health care, meaning that the government should assume some of the responsibility for issues associated with Internet use, including (but not limited to) access, cost, content and quality. The Internet is not just useful for accessing health information. It can also meet health needs in other ways, such as giving people alternative approaches to healthcare, providing social support (i.e. through online health communities) and giving individuals more confidence regarding their health issues (Sillence et al., 2007; Baker et al., 2003). It could also facilitate communication and interactions of people with various aspects of the health care system (i.e. changing the way people use health care, consume resources, seek help), which could potentially improve the health care system and even the health of populations (Baker et al., 2003; Gilmour, 2007). For this reason alone, the role of the Internet as a health promotion tool needs to be examined further at the government level. Being able to access health information on the Internet should be a universal right, just as health care in Canada is provided to everyone on the basis of need, rather than the ability to pay. It can be argued that everyone is in need of health knowledge.

Health Canada has been developing the area of e-health since 1997 and it is now considered an essential part of health care (Health Canada, 2008). Online health literature is also part of e-health, yet it has not been recognized as something Canadians need.

Various e-health strategies continue to be developed for use in the hospital, home care and primary care setting (i.e. telehealth, electronic health records), but few strategies exist for independent, community dwelling adults (who may be chronically ill). Even though several health reforms have taken place over the past several decades, where health care has gradually shifted from a traditional medical model towards a health promotion and prevention model, ensuring access to online health information is not yet a priority in the context of health promotion.

Based on the results of this study, the typical Internet user is a female baby boomer (35-54 years old) with a high level of education (i.e. post-secondary or more) and income, is married, living in a urban area, has a high self-perceived health status, and has access to a computer at home and/or at work. On the other end of the spectrum, the typology of a non-user would be an older female (65+) with low education and income level, not married, living in a rural area, has a low self-perceived health, and restricted access to a computer. The latter represents the extreme characteristics of a non-user; however, it should be acknowledged they exist, and are at a disadvantage in terms of accessing health information online compared to users.

Problems and Issues with Online Health Information

In addition to the issues associated with the digital divide (unequal access to the Internet among disadvantaged populations), it is no surprise that quality is a serious problem when it comes to using the Internet. Since anyone can put health information on the Internet, inaccurate and potentially harmful information can be accessed by anyone if they aren't careful. Just as health care providers are held to a certain standards, the Internet as an information medium should also have standards it needs to meet, if people

are expected to trust it for health advice. With the abundance of health information available on the Internet, people are bound to be confronted with irrelevant or inaccurate information that could lead to misuse, such as improper self-diagnosis or unnecessary and poor treatment (Baker et al., 2003), not to mention stress for the user, where they are often presented with a variety of bleak diagnoses. Consumers of health information need to have skills that allow them to evaluate the quality of information they find on the Internet, however websites should also be accountable for the information that they provide.

According to Eysenbach et al. (1998), there are several problems with Internet health information, including not specifying the intended audience, lack of quality control and missing information about the source of information and authors. There are some health sites in the US that will provide a list of health sites that have been approved as trusted sites (Gilmour, 2007). If something like this exists in Canada, it is not well-established in the literature.

Poor design is also an issue that needs to be addressed in the online health information literature. Visual cues and ease of use have been found to be important for health sites to maintain users. Visual appeal is often the main reason a person accepts or rejects a site (Sillence et al., 2007a). Unfortunately, many health consumers miss out on valuable information due to poor website design (Sillence et al., 2007a). In another study by Sillence et al. (2007b), participants rejected sites that had poor visual design, confusing displays, irrelevant information, and busy “pop-up” advertisements. Some key features of successful sites include visual appeal, user-friendly terms and formats, targeted information, clustering information, clear instructions and links, and

compensation for spelling errors (Gilmour, 2007). As Sillence et al. (2007a) point out, “if people cannot move beyond the poor design then the quality of the content become irrelevant” (p404). Other content-specific advice for health websites includes having a list of frequently asked questions, an option to email an expert, and opportunities for discussion and chat (Sillence et al., 2007a). Consumers of online health information are encouraged to carefully examine issue relating to: developers and sponsors (i.e. is this clearly stated?); purpose (i.e. who is the intended audience?); content (i.e. is it current?); confidentiality (i.e. is user information protected?); design (i.e. is it appropriate for intended users?); and evaluation (i.e. has it been evaluated and are these results available?) (Eng & Gustafson, 1999). Some of these findings should be put into practice by existing health information websites.

Collaborative Initiatives

According to Health Canada “current priorities and efforts focus on addressing policy issues and challenges in mainstreaming eHealth services within Canada's health care system and in measuring progress in the deployment and investment of these services” (Health Canada, 2006). Collaboration has been identified as a key factor in the success of the e-health revolution thus far. Much of the literature points to policy as playing a key role in reducing inequalities related to accessing online health information (i.e. reducing the digital divide) (Cotton & Gupta, 2004; Brodie et al., 2000; Pandey et al., 2003; Gilmour, 2007). Key stakeholders need to work together to make the Internet more accessible as a health promotion tool for the adult and older adult population. This can include government (i.e. Health Canada), private industry (i.e. Internet providers), non-profit associations (i.e. Arthritis Society), professional health associations (i.e.

Canadian Medical Association), health promotion advocates (i.e. Active Living Coalition for Older Adults) and senior advocacy groups (i.e. CARP). These groups need to work together with community agencies to find ways to reduce the barriers to Internet use (and ultimately the use of online health information).

Based on the results of the current study and the findings from the literature, initiatives on the policy agenda could include:

- Public funding for Internet health promotion campaigns (or as an addition to existing campaigns- i.e. ActNow BC).
- Tax breaks or subsidized funding for computers and Internet connections for low income families.
- Standardized rates from Internet providers (regardless of region- i.e. urban/rural/remote).
- Regulated health content on Internet sites, meeting government standards for quality and accuracy of health information (similar to the health check symbol on food labels). These approved sites could be listed on the Health Canada website.
- Repercussions for websites with inappropriate, inaccurate or poor quality health information that could be harmful to consumers (i.e. fines, termination of site, legal action).
- More targeted and tailored information from health organizations (specific information for various sub-groups of baby boomers and older adults- i.e. women, widows, retirees) using findings from the literature (i.e. according to this study, many baby boomers and older adults are interested in disease-specific information).
- Increased online resources (i.e. printable information sheets, online support groups, self-care initiatives, caregiver information, questions to ask physicians) from existing health sites.

- The creation of a national database of community health resources. Communities would register on the website in order to provide a list of programs and services offered in the area.
- Funding from the government for community workshops to teach people how to use the Internet, identify quality health information and apply the information they find (i.e. through follow-ups, individual counselling, referring them to other community resources).
- Government resource centres (i.e. toll-free number, website) for questions regarding health information found, how to find appropriate or relevant information, troubleshooting help and contact information for related resources.
- Local government-sponsored Internet health information workshops for companies/organizations that want to promote the health of their employees.

Limitations

The major limitation to this study was that two data sets needed to be used in order to answer the research questions while using the most recent data possible. The 2005 CIUS was used whenever possible, however due to limitations in the types of questions asked, the 2000 GSS was supplemented in some cases. It was therefore difficult to make direct comparisons across age groups since the data were sometimes taken at two different points in time. An additional limitation lies in the time the study took place. The most recent data set used was from 2005; however with the Internet becoming increasingly popular, actual user rates for 2008 may be much higher than those found in the study. Also, due to the nature of the coding for age in the 2005 data set (lack of 5-year age groups), the exact ages of the baby boomers could not be extracted. In 2005 the baby boomers were between the ages of 40-59, however in the study the boomers were considered 35-54 years old. This may have affected some of the results for the 35-44 group (there were non-baby boomers included) and the 55-64 group (there were baby

boomers included). In the multivariate analysis, several independent variables had to be excluded because of non-independence issues and this limited the conclusions that were able to be drawn from the analysis. Also, measures of ethnicity were not available for use in either the 2000 or 2005 study. This would have been useful to include as an additional socioeconomic variable in the analysis since it has been related to the digital divide. Finally, since it was a cross-sectional study looking at age differences (not a cohort study), only differences between age groups at one point in time could be analyzed, therefore conclusions could not be drawn about cohort or period effects.

Future Research

The results from the current study and the findings from the literature indicate that there are several gaps surrounding the use of the Internet for health information, since it is a relatively new topic. There is limited information regarding the impact of several demographic indicators on the use of the Internet and the use of health information on the Internet in particular, including marital status and region, including how these differ by age and the underlying factors that influence differences in use. Although these variables were included in the present analysis, it was beyond the scope of this study to explore them in detail. In addition, the study looked at the association between gender and Internet use for health information by age, however future research could explore how baby boomer women use the Internet for health information compared to baby boomer men (i.e. how do their searches differ?) in order to better cater to each of their needs. There were also conflicting findings regarding the association between health status and Internet use for health information which could be examined further in future studies.

Future research should also focus on age differences, since health information needs change with age.

The current study was cross-sectional in nature, examining age differences at one point in time, however a longitudinal design or using several cross-sectional data sets might help in establishing trends over time and within a particular generation (i.e. the baby boomers) in order to better predict future patterns and help untangle age, cohort and period effects. A more recent Canadian survey on Internet use that includes health status and ethnicity is also needed. Dependent variables that need to be included in a newer survey are types of health sites visited, type of health information searched for, and barriers to Internet use (specifically) for health information.

Since it is predicted that Internet health information could change health utilization, future research needs to examine the role that health information can play in primary care. For example, physicians could receive training so that they would be able to provide their patients with prescriptions for online health information. Furthermore, patients might be more likely to trust websites recommended by their physicians. Examination of the policy issues surrounding Internet health information use, and more specifically how to reduce the digital divide, is also needed.

Conclusion

The results indicate that there are age differences when it comes to Internet use for health information. These and other differences within populations need to be acknowledged by Internet health information providers. The baby boomer generation comprises a large segment of the population and the higher rates of Internet utilization

and current interest in online health information of baby boomers (compared to older adults) makes them a prime target for online health information. Many of the baby boomers already use the Internet, however less than half use the Internet for health information. There are still many improvements that need to be made and systemic challenges ahead in order to make the Internet and online health information accessible to more people. Particular attention needs to be paid to vulnerable populations since these people are less likely to use the Internet and are more likely to have health issues. Older adults use the Internet less, but this does not mean that they should be ignored when it comes to increasing access and use. In fact, since health information needs increase with age, it can be argued that older adults are actually in greater need of health information than younger adults. However as the baby boomers get closer to the age of onset of chronic illness and disability, their health information needs are increasing as well. Using the Internet for health information helps increase health knowledge which is associated with positive health outcomes. It is thought that these benefits outweigh the potentially negative outcomes that occur in some instances. The Internet as a health promotion tool has an advantage over other strategies in that it is efficient, can reach large audiences and is becoming a common form of technology in households. However, improvements to the accessibility, quality and relevance of health information on the Internet should start now, while prevention is still achievable. As the baby boomers approach the age of 65, timing is crucial in terms of promoting the Internet as a source of health information. It is the hope that by improving the health knowledge of the baby boomers now, that they will take better care of their health as they age. Through government initiatives and collaboration between health promotion stakeholders, policies and programs that foster

health information use through the Internet could change the way people view their health, provide and receive care, and use health care services. This could have an enormous impact on the health of the population. Future studies need to focus on how the Internet can better meet the health needs of Canada's diverse aging population.

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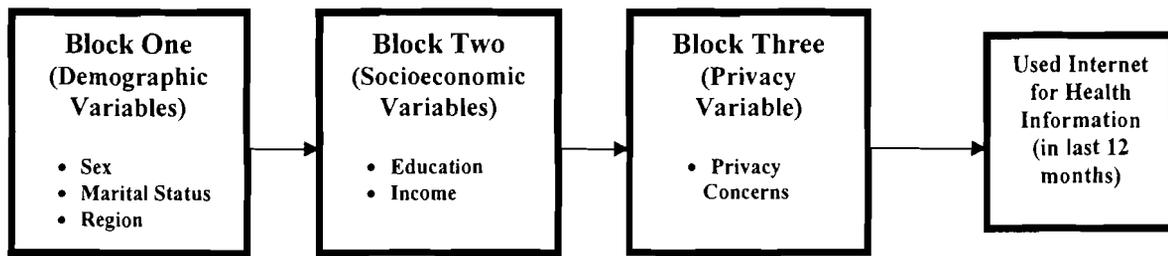
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Appendices

Appendix A: Conceptual Model for Logistic Regression Analysis



Appendix B: Logistic Regression Results

Age Group	Block	Model Chi Square	Block Chi Square	Variable	Beta	Standard Error	Odds Ratio
35-44	1	193.00***	193.00***	Sex- Female (male)	0.39	0.05	1.48***
				Married (not married)	0.55	0.06	1.73***
				Urban (rural)	0.44	0.06	1.55***
45-54	1	138.09***	138.09***	Sex- Female (male)	0.31	0.05	1.37***
				Married (not married)	0.44	0.06	1.55***
				Urban (rural)	0.46	0.06	1.58***
55-64	1	80.78***	80.78***	Sex- Female (male)	0.27	0.07	1.31***
				Married (not married)	0.52	0.08	1.69***
				Urban (rural)	0.39	0.07	1.48***
65+	1	151.34***	151.34***	Sex- Female (male)	-0.26	0.08	0.77**
				Married (not married)	0.88	0.10	2.41***
				Urban (rural)	0.54	0.10	1.71***
35-44	2	554.52***	361.52***	Sex- Female (male)	0.43	0.05	1.54***
				Married (not married)	0.18	0.07	1.20**
				Urban (other)	0.24	0.06	1.28***
				Post Second (High school or less)	0.60	0.06	1.83***

Age Group	Block	Model Chi Square	Block Chi Square	Variable	Beta	Standard Error	Odds Ratio
				Income- Lower Middle (Lower)	0.32	0.12	1.37*
				Income- Middle (Lower)	0.40	0.12	1.49**
				Income- Upper Middle (Lower)	0.71	0.11	2.04***
				Income- Upper (Lower)	1.18	0.12	3.24***
45-54	2	581.97***	443.88***	Sex- Female (male)	0.37	0.05	1.44***
				Married (not married)	0.07	0.07	1.08
				Urban (rural)	0.28	0.07	1.33***
				Post Second (High school or less)	0.67	0.06	1.95***
				Income- Lower Middle (Lower)	0.22	0.14	1.25
				Income- Middle (Lower)	0.75	0.13	2.12***
				Income- Upper Middle (Lower)	0.81	0.13	2.26***
				Income- Upper (Lower)	1.35	0.13	3.86***
55-64	2	424.94***	344.15***	Sex- Female (male)	0.39	0.07	1.47***
				Married (not married)	0.18	0.09	1.19*
				Urban (rural)	1.85	0.08	1.20*
				Post Second (High school or less)	0.79	0.07	2.20***

Age Group	Block	Model Chi Square	Block Chi Square	Variable	Beta	Standard Error	Odds Ratio
				Income- Lower Middle (Lower)	0.18	0.14	1.20
				Income- Middle (Lower)	0.71	0.14	2.03***
				Income- Upper Middle (Lower)	0.89	0.14	2.43***
				Income- Upper (Lower)	1.24	0.14	3.45***
65+	2	582.10***	430.76***	Sex- Female (male)	0.00	0.09	1.00
				Married (not married)	0.56	0.11	1.75***
				Urban (rural)	0.35	0.10	1.41**
				Post Second (High school or less)	1.20	0.09	3.33***
				Income- Lower Middle (Lower)	0.86	0.15	2.35***
				Income- Middle (Lower)	1.40	0.16	4.06***
				Income- Upper Middle (Lower)	1.54	1.67	4.67***
				Income- Upper (Lower)	1.59	1.89	4.89***
35-44	3	577.89***	23.38***	Sex- Female (male)	0.43	0.05	1.54***
				Married (not married)	0.20	0.07	1.22**
				Urban (rural)	0.24	0.06	1.27***

Age Group	Block	Model Chi Square	Block Chi Square	Variable	Beta	Standard Error	Odds Ratio
				Post Second (High school or less)	0.60	0.06	1.81***
				Income- Lower Middle (Lower)	0.30	0.12	1.35*
				Income- Middle (Lower)	0.38	0.12	1.46**
				Income- Upper Middle (Lower)	0.69	0.12	2.00***
				Income- U (Lower)	1.15	0.12	3.17***
				Privacy- Concerned (not at all concerned)	0.31	0.07	1.37***
				Privacy- Very concerned (not at all concerned)	0.09	0.07	1.10
45-54	3	596.38***	14.41**	Sex- Female (male)	0.36	0.05	1.44***
				Married (not married)	0.07	0.07	1.07
				Urban (rural)	0.29	0.07	1.33***
				Post Second (High school or less)	0.66	0.06	1.93***
				Income- Lower Middle (Lower)	0.22	0.14	1.25

Age Group	Block	Model Chi Square	Block Chi Square	Variable	Beta	Standard Error	Odds Ratio
				Income- Middle (Lower)	0.75	0.13	2.11***
				Income- Upper Middle (Lower)	0.81	0.13	2.24***
				Income- Upper (Lower)	1.34	0.13	3.83***
				Privacy- Concerned (not at all concerned)	0.15	0.08	1.17*
				Privacy- Very concerned (not at all concerned)	-0.08	0.07	0.93
55-64	3	439.83***	14.90**	Sex- Female (male)	0.39	0.07	1.47***
				Married (not married)	0.17	0.09	1.19
				Urban (rural)	0.19	0.08	1.21*
				Post Second (High school or less)	0.77	0.08	2.17***
				Income- Lower Middle (Lower)	0.18	0.14	1.19
				Income- Middle (Lower)	0.70	0.14	2.02***
				Income- Upper Middle (Lower)	0.88	0.14	2.40***
				Income- Upper (Lower)	1.23	0.14	3.42***

Age Group	Block	Model Chi Square	Block Chi Square	Variable	Beta	Standard Error	Odds Ratio
				Privacy-Concerned (not at all concerned)	0.20	0.10	1.22*
				Privacy- Very concerned (not at all concerned)	-0.10	0.09	0.91
65+	3	648.76***	66.66***	Sex- Female (male)	0.02	0.09	1.02
				Married (not married)	0.58	0.11	1.79***
				Urban (rural)	0.36	0.11	1.43**
				Post Second (High school or less)	1.22	0.09	3.37***
				Income- Lower Middle (Lower)	0.81	0.15	2.25***
				Income- Middle (Lower)	1.38	0.16	3.98***
				Income- Upper Middle (Lower)	1.47	0.17	4.35***
				Income- Upper (Lower)	1.52	0.19	4.59***
				Privacy-Concerned (not at all concerned)	0.09	0.12	1.10

Age Group	Block	Model Chi Square	Block Chi Square	Variable	Beta	Standard Error	Odds Ratio
				Privacy- Very concerned (not at all concerned)	-0.64	0.11	0.53***