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# Online Health Information Gathering And Health Service Utilization By Emergency Department Patients With Acute, Non-Urgent Illness Symptoms

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# ONLINE HEALTH INFORMATION GATHERING AND HEALTH SERVICE UTILIZATION BY EMERGENCY DEPARTMENT PATIENTS WITH ACUTE, NON-URGENT ILLNESS SYMPTOMS

by

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# DEDICATION

I dedicate this doctoral dissertation to my mother, Eleanor Yastik, without whose love, support, and ongoing encouragement made the achievement of this educational goal possible. This has been a long journey and I could not have done this without you.

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# LIST OF ABBREVIATIONS

ACEP (American College of Emergency Physicians)

AHRQ (Agency for Health Research and Quality)

ARPA (Advanced Research Projects Agency)

ARPANET (Advanced Research Projects Agency Network)

CDC (Center for Disease Control)

CHIR (Consumer Health Informatics Resource Service)

CHIRS (Consumer Health Informatics Research Resource)

ED (Emergency Department)

ENA (Emergency Nurses Association)

IRB (Institutional Review Board)

HINTS (Health Information National Trends Survey)

NIH (National Institute of Health)

NINR (National Institute of Nursing Research)

NSF (National Science Foundation)

NSFNET (National Science Foundation Network)

PI (Principal Investigator)

TCP/IP (Transmission Control Protocol/Internet Protocol)

U.S. (United States)

WSU (Wayne State University)

WWW (World Wide Web)

## CHAPTER 1 INTRODUCTION

The influence of the Internet on our global society cannot be overstated. One of the most utilized areas on the Internet is the quest for health information (Bouche & Migeot, 2008; Goldman & Macpherson, 2006; Warner & Procaccino, 2007, Seckin, 2014, Individuals from a variety of demographics are increasingly turning to the Internet to seek health information. With the 24-hour availability of the Internet and relative ease of access, the Internet has, and continues to have, an influence on health. The Internet provides a way to help people become more active participants in their own health, guide decisions on how to treat illness, and assist people to take better care of themselves. These activities may potentially increase self-efficacy or locus of control. Seeking health information has been increasingly documented in the literature as a key coping strategy and as a method of becoming a more active participant in one's own health (Rice, 2005; Silence, Briggs, Harris, & Fishwick, 2007; Kruse, Koopman, Wakefield, Wakefiled, Keplinger, Canfield and Mehr, 2012) According to Bass **(**2003), little research has been done, however, to assess the relationship between patient's use of online health information and self-efficacy, health status, or decisions regarding utilization of heath care services.

### Internet & Internet Health Information Usage

The Internet has since its inception, and continues to have, a remarkable impact on our global society. The availability of health information to patients on the Internet is revolutionizing health care from both the consumer and provider perspective. According to the Pew Internet and American Life Project January 2014 report, the most recent statistic available, 87% of U.S. adults use the Internet (Pew, 2014). Based on the results of the Pew Internet September 2012 survey, 72% of these Internet users looked online for health information within the past year. Individuals search the Internet to find health information, become more active participants in their own health, and make informed decisions about health. Internet health information searches are often based on an individual's specific health needs and conditions (Nettleton, Burrows, & O'Malley, 2005).

The Internet is a growing source of information for health care consumers. Currently, there are approximately 113 million Americans using the Internet for health related questions and the number of people who can access information and the amount of information is continually growing (Coiera, 1996; Josefsson & Hanseth, 2000). Most of those who sought health information on the Web reported that the information found affected their health behaviors (Fox, 2006; Holland, 2008). According to Ybarra and Suman (2006), 55% of all health information seekers contacted a health provider because of information they found online. This statistic suggests that further research is warranted in a number of directions, including readability and credibility of health information sites, but more importantly, whether online health information may inform location of health care services.

The overarching focus of this study was to describe online health information seeking in Emergency Department (ED) patients and its impact on seeking health care in an ED. Through this and further research, researchers should gain significant insight into information usage, usage of appropriate levels of service which may include avoiding the high costs incurred in the ED, and ultimately address one aspect of ED overcrowding.

## Emergency Department Utilization

Emergency department utilization is multifaceted. For the majority of patients, the ED is used only when confronted with an acute emergency situation, often life-threatening. For others, the ED is a source of primary healthcare and the only guaranteed access point to medical care (Peterson, 1998). Current statistics indicate that in spite of the Affordable Care Act, persons are still utilizing the ED for primary care services (Pew, 2014, ACEP 2015). According to the National Healthcare Disparities Report (2012), more than 40 million Americans do not have a specific source of ongoing care. No demographic group has yet achieved the Healthy People 2020 target of 85% of Americans with a usual primary care provider. Thus, the ED serves as the gateway to health care for many Americans who may not be able to access services elsewhere.

ED visits have increased dramatically in recent years. Between 1996 and 2006, the number of ED visits annually increased by an alarming 32% (Pitts et al, 2008) with most ED's reporting over-crowding (Koziol-McLain, Price, Weiss, Quinn & Honigman, 2000). According to the Centers for Disease Control and Prevention (CDC), Americans made 136.1 million visits to one of the country's nearly 3,900 emergency rooms in 2012. This number has increased from 114 million visits in 2006 (National Center for Health Statistics, 2013), representing a 12% increase in the use of already overcrowded ED's.

One reason for the steady and marked increase in ED visits is the use of ED's for non-urgent care. One-third to one-half of emergency visits have been classified as non-urgent or semi-urgent, suggesting that care sought in an ED could be provided in other less costly and more appropriate settings (National Hospital Ambulatory Medical Care Survey, 2013). Appropriateness implies use of the ED for urgent or emergent care that is "when a patient requires immediate attention for an acute illness or injury that threatens life or function and where a delay would be harmful to the patients" (National Center for Health Statistics as cited by McCraig, 1994, p.12). These labels that determine appropriateness are often assigned retrospectively. Non-urgent classifications do not take into consideration the nature and ambiguity of symptoms precipitating the patient's visit to the ED, nor does it reflect the patient's initial perceptions of the urgency (Gooding et al., 1996).

Care for non-urgent needs in an ED is costly compared to care in the community. In fact, a new NIH-funded study finds the average cost for an ER visit was over $2,000 — about 40 percent more than most people spend on their rent each month (Culp-Ressler, 2013). Additionally, according to the Department of Health and Human Services, the average charge for treating non-urgent conditions was up to five times that of a Medicaid-covered visit to a physician's office (Culp-Ressler, 2013). According to the National Association for Community Health Centers, a 2006 estimate included more than $18 billion annually is spent on non-urgent ED visits-visits that could be treated in a physician office or clinic. The already strained U.S. health care system also faced an influx of patients in 2014, when 32 million previously uninsured Americans now have health insurance for the first time.

Unnecessary ED visits have adverse effects on both cost and efficiency of service delivery. This validates the importance of research initiatives examining appropriateness of ED utilization and factors that may influence utilization (Gooding, Brannigan-Smith, & Peyrot, 1996). Since the publication of this 1996 study, few studies have been found that address ED utilization. These issues make the measurement and development of new strategies and models investigating online health information seeking coupled with resultant health service utilization essential.

## Statement of the Problem

Patient’s access to and use of online health information use has been widely studied. Aspects include access to and use of the Internet, demographics of those who are using the Internet, Internet information seeking after a medical diagnosis is received, and alternative treatment options. To date, little is known on how this information is being used or whether there is a link between online health information seeking and health service utilization, including location of care or appropriateness of the level of care. As ED patients comprise a large proportion of those seeking health care, and it is recognized that many ED visits are not appropriate, and costlier when compared with other locations of care, it is imperative that current research examines the potential correlation of online health information seeking with ED health service utilization. For the size of the demographic of patients visiting the ED, there is little research to date that links use of Internet or online information use and ED patients. Acute illness is common and these patients represent a large group for whom policy initiatives could be developed (Matthews & Barnsley, 2003).

## Purpose of the Study

The purpose of this study was to examine the online health information-seeking practices of Emergency Department (ED) patients when experiencing acute, non-urgent illness symptoms. The specific aims of this study were to:

1. Determine the characteristics of Internet health information gathering (e.g. type of sites visited, time spent) accessed by non-emergent ED patients with acute illness symptoms.

2. Identify the extent to which individual characteristics (e.g. demographics) and need state (e.g. acute symptom characteristics) influenced Internet health information gathering in non-emergent ED patients.
3. Identify the extent to which Internet health information gathering influenced seeking medical services (e.g. decision to go to ED).

## Conceptual Framework

The purpose of this research was to describe Internet health information gathering in ED patients. The purpose included describing the characteristics of Internet health information sources most often accessed, as well as the demographic and symptom characteristics that influenced Internet health information gathering and subsequent ED use in persons presenting to the ED with an acute, non-urgent symptom(s). As there are many variables that are embedded within this phenomenon, driving this research was whether there is a correlation between Internet health information gathering and ED utilization. The theoretical basis that was used to investigate this phenomenon was a newly developed model, designed to provide the missing link between two integrated conceptual models, one an information seeking model and the other a health service utilization model. Upon review of the literature, as no one model adequately captured the phenomenon of health information seeking and health service utilization, the Lenz Model of Information Seeking (1984) and the Andersen and Newman Model of Health Service Utilization (1973) were integrated. The new model was then developed incorporating the elements of online health information seeking in response to a specific health concern and utilization of health services included as the outcome. Both the information seeking and health utilization models are described below followed by the description and schematic of the new model.

## Overview of the Lenz Analytical of Model of Information Search

The information seeking patterns of clients have received little attention in nursing theory and research, yet they are important antecedents of health-related decisions and behavior (Lenz, 1984). Lenz conceptualized health information search as an interpersonal process with the primary sources of information being others to whom one has direct access or can be referred (1984). The Lenz six-step process model was derived from literature related to consumer decision-making and health care utilization. According to Lenz, individuals obtain health information by two means: active search and passive acquisition. The Lenz Information-Seeking Model focuses on active search behavior, initiated when a specific event occurs which triggers recognition by the individual that information is needed. When an actual or potential health problem exists, the individual seeks information by using either personal sources (whereby information is sought from someone known personally to the searcher), or impersonal sources (whereby information is sought from an inanimate source such as a publication, or someone unknown to the searcher). Typically, a combination of both sources is used in the active search process (Holmes &Lenz, 1997).

As this model was developed prior to the emergence of the Internet, online heath information seeking on the Internet has added a new dimension of direct access to health information not considered by the original model. The Lenz model assumes a person desires information and "represents the analytically distinct steps hypothesized to comprise a search episode, the flow of events which precede the initial voluntary contact (or attempted contact) with a health service provider" (p.182). This model most accurately reflects a theoretical framework to be utilized in terms of general online health information seeking, although elements would need to be included to update the model to represent

Internet-specific health information seeking and include the patient's perception of need severity.

There are six distinct steps in the Lenz model related to information seeking:

1. A Stimulus. According to Lenz (1984), a wide variety of situation specific occurrences may start the information search process. Stimuli may derive from within the person (e.g. the experience of symptoms or injury) (p. 62). Common stimuli for health related information search include recognition of a problem to be solved (p. 62). The degree of importance and uncertainty of risk, aspects of the stimulus, may also affect the subsequent steps of the search.
2. Goal Setting. Some authors suggest that persons confronting a problem or choice use existing information to set goals that place parameters on the information search and acquisition. (Bettman, 1973, as cited in Lenz, 1984). They decide in advance how soon information must be obtained, the information sources to be used, the kind of information desired or the number of alternatives to be investigated (Lenz, 1984, p. 62). Goal setting is not necessary for the search process to continue; however, goal setting may focus the search activities.
3. A Decision Regarding Whether to Seek Information Actively. Once a stimulus is recognized, a decision must be made whether to engage in an active information search. This decision can be influenced by prior amount of relevant information and whether engaging in a new search provides added benefit. If "cost" (financial or time expenditures, frustration, added confusion) outweigh the benefit, a decision to engage in a search is unlikely.

4. Search Behavior. If a person makes the decision to seek information actively, they move into a key step of the process-search behavior. The search behavior involves extent of search, generally defined as the total number of activities carried out that encompasses scope (number of alternatives) and depth (number of dimensions of alternatives investigated). Another dimension of search behavior is method of search. The method of the search is addressed by the type of information sources utilized. The two search behavior methods include 1) impersonal, defined by Lenz as an inanimate source (e.g. publication, referral service or person unknown to the searcher) and 2) personal, defined as information sought from a known individual. Often, these two types of search methods are used in combination, although Lenz states health professionals may fail to acknowledge the value of impersonal information sources to clients (Lenz, 1984, 63).
5. Information Acquisition and Codification. This separate step follows the search behavior (p. 65). After each search activity, the searcher evaluates the information acquired to determine whether it is new and relevant, new and irrelevant, or redundant (Lenz, 1984, p 65).
6. A Decision Regarding the Adequacy of the Information Acquired. After a search commences and information is obtained, the information seeker needs to evaluate the information found in order to determine if further information seeking is needed or if the search is complete.

Lenz (1984, p.67) also posits there are background variables that influence search behavior. These background variables include sociodemographic variables, such as age, gender, and education, as well as previous health experiences. Older adults are less likely to engage in the search process and women are more likely to engage in information seeking behaviors (Lenz, 1984). Those individuals with higher educational levels are also more likely to engage in the search for information (Lenz, 1984). These findings remain consistent with the current online health information seeking literature and demographics of users. These and other demographic variables will be addressed in the new model.

One example of a study similar to the proposed research is described as follows. Behrmann-Hitzig (1992) used the Lenz model to investigate subjects' reported search processes prior to making decisions regarding elective surgery. The aims of the study were to: 1) describe the search process and information acquisition that was influential in making the decision to undergo an elective procedure, 2) clarify the relationships among variables, specifically sociodemographic and contextual, 3) compare perceived and actual information needs to determine if information seeking was on point, 4) describe patterns and barriers to information search and acquisition, and 5) explore the nature of the relationships between search processes and patient outcomes perception. In this qualitative, exploratory study, 20 males and females were interviewed after surgery about the information search process preceding elective surgical procedures. A semi-structured interview guide which paralleled the Lenz model was developed by the researcher. Respondents were asked to describe their search process including the identification of individuals from whom they sought information, past experiences that may have influenced search, search barriers, and outcomes of their search. Findings were inconsistent with previous work by Lenz, although it should be noted that Lenz, in previous works, studied well individuals. The patients in the study by Behrmann-Hitzig had known medical conditions for which medical/surgical intervention was required unlike previous research by Lenz when studying healthy individuals. Despite the inconsistency among the findings, it was concluded that the Lenz model accurately reflects search behavior. Combined with the following behavioral model of health service utilization, gaps in the literature regarding online health information seeking and utilization of health services could be studied.

## Overview of the Andersen and Newman's Behavioral Model of Health Service Utilization

The Behavioral Model of Health Service Utilization, developed in the 1960's by Andersen and Newman, and now on its fourth phase of revisions, was developed to discover conditions that either facilitate or impede health service utilization (Andersen & Newman, 1973). Historically, studies investigating health care utilization did not consider information seeking, in spite of the fact that information seeking is now considered a basic step in the decision to seek health services. This model, also developed prior to the advent of the Internet, has gone through numerous revisions. Initially, the family as a unit was the center of health service utilization. During the revision processes, the focus shifted from the family unit to an individual perspective. According to the Behavioral Model of Heath Service Utilization, an individual's access to and use of health services is considered to be a function of three characteristics: predisposing factors, enabling factors, and need factors. Each factor is described below.

**Predisposing Factors**. Predisposing factors are the socio-cultural characteristics of individuals that exist prior to their illness and include social structure, health beliefs, and demographics. The framework identifies socio-cultural factors of individuals that provide a context for understanding the individual. Social structure takes into consideration the educational and occupational state of the individual along with social interactions within the context of ethnicity and culture. Intrinsic factors in the Andersen and Newman model include a) health beliefs, knowledge, and attitudes and b) demographic factors including age, gender, and marital status.

**Enabling Factors**. The Andersen & Newman Model also describes *enabling factors* that influence the logistical aspects of care attainment. Enabling factors include personal and family characteristics that enable one to have the capacity to navigate the health care system. Enabling factors also include the availability of health care facilities and health insurance. The Andersen and Newman Model also include genetics and psychological factors, such as cultural variations, that could influence health care attainment.

**Need Factors**. Need factors are described by Anderson and Newman as the person’s perception of their overall health, impairment of quality of life, or the self-assessment of health status. Components of the newly developed model will be used to investigate need factors coupled with utilization related to specific need factors--how a person views illness can influence whether they view their acute symptom as important enough to seek professional health services.

A 2008 study similar to the proposed research in terms of addressing specific symptoms used the Andersen and Newman Model (Shaw, Brittain Tansey, & Williams, 2008). Specifically, Shaw and colleagues conducted a qualitative study that described the decision making process for help seeking in middle and older adults with urinary symptoms. In-depth interviews were conducted with 33 men and women who sought medical care for urinary symptoms. This basis for this research was the fact that previous models to explain help seeking/health service utilization have not adequately addressed the role of symptoms in the help seeking decision making process. Several models were used to analyze the data, including the Andersen Model. Enabling and need factors identified in the study were the symptoms prompting people to seek care and the assessment of symptom severity. No predisposing factors emerged in this study, although they were only addressing urinary symptoms rather than a wide variety of conditions as would present in an ED. A need exists to replicate this study in other populations which may yield different results in the emergence of predisposing factors such as age, gender, education, and income as variables of interest.

## Integration of Health Information Seeking and ED Health Service Utilization and Outcome Model

This newly developed model, depicted below, addresses limitations of the 1984 Lenz Model that looks only at information search, not including the Internet as a source of health information, and the Anderson and Newman Model that does not address information seeking related to utilization. Neither model addresses outcomes of information search, as in what people do after they search for health information online or how that information may inform location of health service utilization, such as in an ED. According to Longo, (2005) there is a critical need for updated, more comprehensive, and integrated conceptual models to help health care providers, patients, and consumers, as well as researchers to better understand health information seeking of patients.

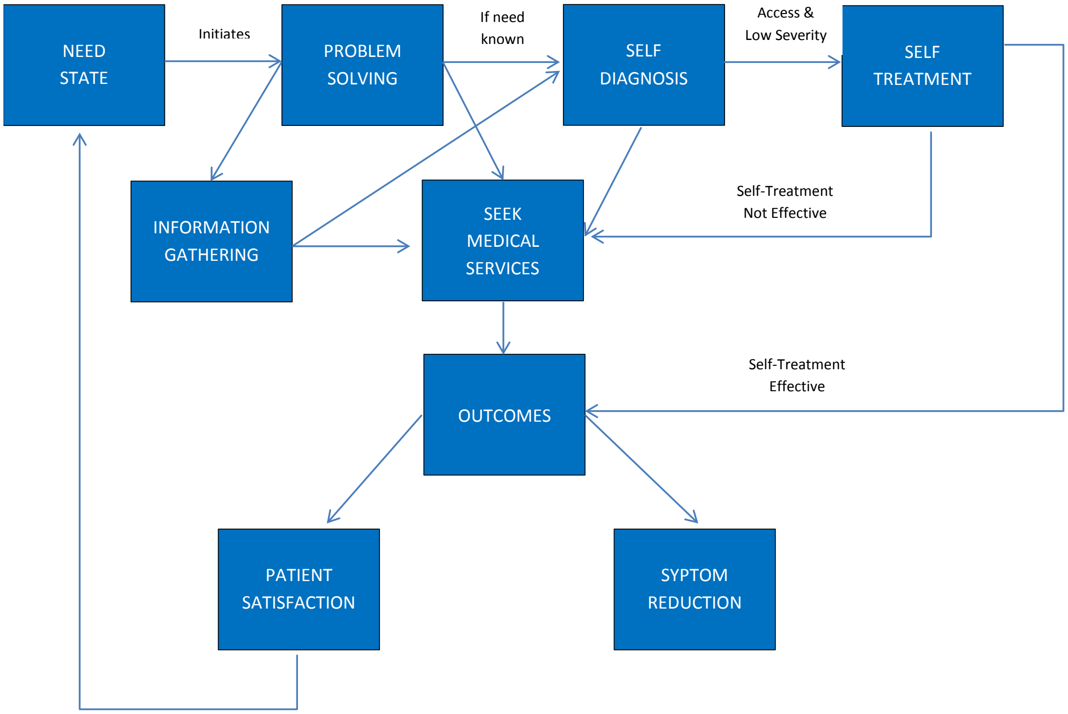


Figure 1: Yastik Online Health Information Gathering and Health Service Utilization Model (YOHIGHSU)

The first phase of the model, the Need State, mirrors the concept of stimulus in the Lenz information seeking model. This need state is defined as the onset of and/or recognition of the acute illness symptom(s) which alerts a person that there is a health concern or interferes with daily functioning. Patient's perception of the severity of the need will also be investigated. Once the need state has been recognized, Problem Solving commences.

The next phase in the model is Problem Solving, similar to goal setting in the Lenz Model. In the Lenz model, only the time in which information must be obtained and the type of information desired is addressed. The new model takes into consideration that a person may address their own problem without seeking additional information or seeking medical services. Problem solving is defined as the steps taken by a person to rectify the need state.

In this model, problem solving can move in three directions--Information Gathering, (addressed by Lenz as Search Behavior), to Seek Medical Services, or to Self-Diagnosis. Information gathering includes seeking information from family member, friend, print media, online/electronic media or a combination of the above sources. The focus of this research will be on online/electronic media and address Internet access, number of sites visited, time spent on site, and amount of time spent conducting search. Additionally, after information gathering, another decision point occurs related to whether information is sufficient or insufficient to problem solve. If information gathered is sufficient, symptom severity is perceived as low, and access to health services is limited, problem solving may be ongoing. If information gathered is insufficient, the decision may be to seek medical services. If information gathered is insufficient but symptom severity is perceived as high, the decision may also be to seek medical services. This model, then, presents several possible areas of study scenarios in regards to low/high perceived need severity and whether or not access to health services is accessible. Problem solving also addresses if a need state is known or unknown (i.e. person has experienced the acute symptom previously or the symptom(s) are readily identifiable) as well as perception of symptom severity (low or high). Information gathering is directly linked to Problem Solving. First, if the information gathered is sufficient, the perceived symptom need state severity is low, and access to health services are limited, this may also lead a person back to self-diagnosis. If the information gathered was insufficient, the perceived symptom need state is high, and access to health services are available, then a person may seek medical services. Problem solving can lead to several different plans of action. The plan of action will also consider variables such as age, gender, time of day, SES, transportation, insurance/money, and perceived severity of need (onset/intensity / duration), ambulatory capabilities and Health Locus of Control.

The next phase is Self-Diagnosis. Self-diagnosis would cause a person to draw a conclusion regarding their symptom(s). This conclusion could be to Self-Treat or to seek health services. Self-treatment is also based on severity of symptom(s) and if access to medical services and/or a solution is readily available (i.e. Tylenol, cough medicine, ice pack, etc.). If severity of symptom(s) is perceived as low, then a person may choose to self-treat based on past experience, past health status, educational level, and socioeconomic status. If the self-treatment is effective, this completes the cycle. If the self-treatment does not work, medical services could be sought. If need is unknown and perceived severity is low, then further information gathering may result. If need is unknown and severity high, then a person may seek medical services. If perceived severity is high OR access to solution is restricted/less than readily available, then a person may also seek medical services. If self-treatment is not effective, (i.e. need state persists, worsens) that may also lead a person to seek medical services.

Seeking Medical Services can be a primary outcome or an outcome leading to two secondary outcomes if medical services are sought. In the first instance, seeking medical service is the outcome and the focus of the proposed research. In the second instance, and paving the way for future study, once a person Seeks Medical Services, two additional Outcomes can be addressed: Is there a reduction in the need state? For example, are symptoms reduced or alleviated? Another secondary outcome relates to patient satisfaction in terms of how closely expectations were met related to diagnostic practices and/or treatment plan. Examples include: Once a diagnosis is made, is the diagnosis consistent with the information obtained through online search? Or based on information gathered online, did medical services received fit with expectations in terms of diagnosis and treatment? If the expected diagnosis is not consistent with the expectation or symptoms are not reduced, alleviated or expectations not met, the need state persists and the person would then repeat the cycle.

This discussion provides an overview of the newly developed model that integrated and addressed limitations of the Lenz information Seeking and Anderson and Newman Health Service Utilization model. Because of the complexity of the model, the specific aims for the research conducted focused on the concepts of Individual Characteristics, Need State, Information Gathering, and Seeking Medical Services as key variables of interest (See Figure 2). The key variables along with their conceptual definitions follow.

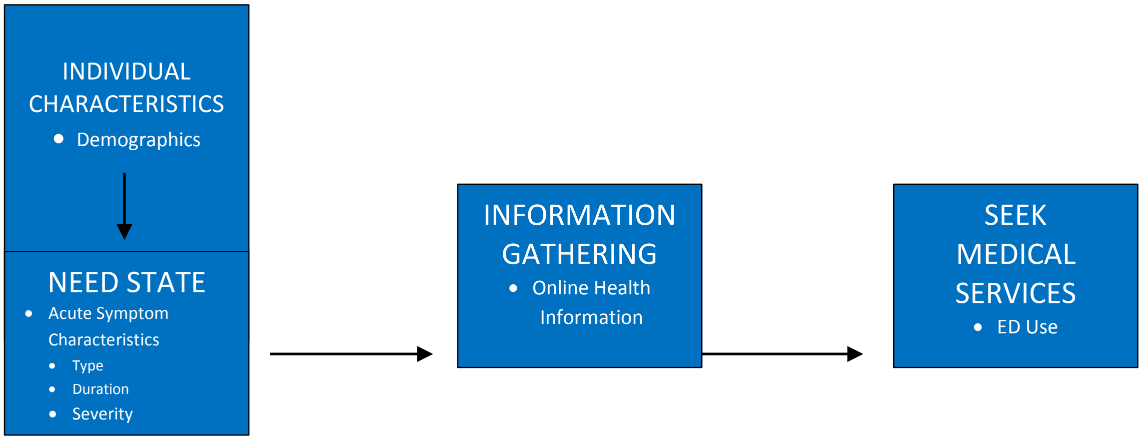


Figure 2: Model Study Variables

## Conceptual Definitions of Key Variables

**Individual Characteristics**. Individual characteristics are the physical and psychosocial qualities that describe an individual. For this study, general demographic characteristics will be focus. Demographic characteristics are conceptually defined as background information that provides the social characteristics of a subject and will include age, gender, ethnic background, educational level, income, insurance status and identification of a primary health care provider**.**

**Need State.** The conceptual definition of need state is the onset and/or recognition of the acute illness symptom(s) which alerts a person that there is a health concern or interferes with daily functioning.

**Acute Symptom Characteristics.** Acute symptom characteristics are a subset of need state and are conceptually defined as the symptom type, timing of symptom onset and duration, patient’s perception of the severity of the need state.

**Information Gathering.** Information gathering is conceptually defined through use of the Consumer Health Information Resource Service (CHIRS) definition for Internet Health Information Seeking as *intentional, active efforts to obtain specific information above and beyond the normal patterns of media exposure and use of interpersonal sources* (Atkin, 1973; Griffin, Dunwoody, & Neuwirth, 1999). Information gathering includes "any non-routine media use or interpersonal conversation about a specific health topic and thus includes behaviors such as viewing a special program about a health-related treatment, using a search engine to find information about a particular health topic on the Internet, and/or posing specific health-related questions to a friend, family member, or medical practitioner outside the normal flow of conversation" (Niederdeppe, Hornik, Kelly, et al., 2007, p. 155).

**Seek Medical Services** (ED Use). Seek medical services (ED use) is conceptually defined as the interaction between health professionals and patients seeking care in the ED.

## Significance for Nursing

The expected outcomes from this study will yield new insight and attempt to fill in the gaps in the body of knowledge regarding online health information seeking in the context of the ED. This study addressed two gaps in the information seeking literature:1) ED patients, an understudied group, and 2) online information seeking in patients with acute, non-urgent illness symptoms. As the access to and amount and types of information on the Internet continue to grow, an understanding by nurses surrounding online health information seeking and usage in all patient settings and conditions is necessary. Results will also enable nurse researchers, and other researchers alike, to better meet the needs of all types of patients with varying demographics with acute conditions.

This study expands on and adds to what is already known about online health information use in the general population and in patients with chronic conditions. What was currently understudied were ED patients with acute, non-urgent illness symptoms. This information, coupled with information that has been obtained about ED usage, may yield new insight to a possible cause of ED overcrowding. If it is identified that online information seeking is a contributing factor to ED overcrowding, other more cost-effective treatment locations can be identified to better meet patient needs.

As this study was conducted through a nursing lens, this allows nursing to play a vital role in terms of patient education, appropriate use of health service resource utilization, and improved patient outcomes. While it is known that online health information is used by consumers, little is known about how they locate health information, their perception of the information found, and what action is chosen after their search is complete.

## Significance for Online Health Information and ED Utilization Research

The topic of online health information seeking provides fertile ground for researchers. Adequate, credible, health information can *increase knowledge, assist in coping, decrease stress, provide social support,* and *contribute to a healthier lifestyle*.

According to Consumer Health Informatics Research Resource, (CHIR) (http://chirr.nlm.nih.gov/health-information-seeking.php) recent research conceptualizes health information seeking both as a predictor and as an outcome variable providing the opportunity for research in numerous directions. As an outcome variable, health information seeking can be impacted by demographics and individual differences, such as a person's information needs (Baker, 1995; Bennenbroek, Buunk, Van der Zee, & Grol, 2001; Boberg et al., 2003; Borgers et al., 1993; Cameron et al., 1994; Connell & Crawford, 1988; Ford, Coups, & Hay, 2006; Lock & Wilson, 2002).

This study also addresses two of the nation's Healthy People 2020 overarching objectives: Access to Health Services and Health Communication/Health Information Technology (Healthy People 2020). Access to comprehensive, quality health care services is important for the achievement of health equity and for increasing the quality of a healthy life for everyone. The topic area of Access focuses on four components of access to care: coverage, services, timeliness, and workforce. This study also focuses on both services and timeliness. Accessing a health care location where needed services are provided and also improving health care services depends in part on ensuring that people have a usual and ongoing source of care. People with a usual source of care have better health outcomes and fewer disparities and costs. The next Healthy People 2020 objective of Health Communication and Health Information Technology (IT) are central to health care, public health, and the way our society views health. These processes make up the context and the ways professionals and the public search for, understand, and use health information, significantly impacting their health decisions and actions. With the increasing complexity of health information and health care settings, most people need additional information, skills, and supportive relationships to meet their health needs (http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=18). Disparities in access to health information, services, and technology can result in lower usage rates of preventive services, less knowledge of chronic disease management, higher rates of hospitalization, and poorer reported health status (Berkman, DeWalt, & Pignone, et al., 2004). Both public and private institutions are increasingly using the Internet and other technologies to streamline the delivery of health information and services. This results in an even greater need for health professionals to develop additional skills in the understanding and use of consumer health information.

This study also aligns well with the goals and research priorities of both the Emergency Nurses Association (ENA) and the Agency for Healthcare Research and Quality (AHRQ). The ENA regularly identifies research priorities for the field of emergency nursing. These priorities provide a focus for nurse researchers' efforts in conducting research on questions that are significant to both emergency nursing practice as well as to emergency care consumers (http://www.ena.org/practice-research/research/priorities/Pages/Default.aspx). Current ENA research initiatives include influence of healthcare technologies, as well as practice priorities related to ED crowding. This study will be a first step in addressing how online health information seeking may contribute to utilization of ED services and pave the way for future studies that may link online health information seeking as a factor contributing to ED crowding.

AHRQ Research priorities include funding for projects that address consumer's health information needs and practices. According to the AHRQ, there is still a lack of basic research around these needs and practices and how these methods are influenced by a multitude of other contextual factors (e.g., care settings, demographics, motivations, user capabilities and limitations, informal care giving networks, technology sophistication, and access to Internet). AHRQ research priorities, designed to bolster basic research to better understand health information practices, needs and goals, which are shaped by numerous contextual factors, are built around the following five areas of interest:

1. The needs and preferences of diverse user groups in different contexts;
2. User goals, activities, and personal health information management practices;
3. User capacities (e.g., cognitive, physical, health literacy);
4. User motivation (including beliefs and preferences); and
5. Identifying "expert" user groups (e.g. frequent health care consumers and their caregivers) and studying them as models.

**Significance for Nursing Theory and Research**

Nursing theory, research and practice are tightly interwoven within nursing science. Theory and research should provide the principles that underpin practice and help to generate further nursing knowledge (Colley, 2003). According to Fawcett (1991), a commitment to the development of nursing knowledge aims to explain the relationships between and among concepts specific to nursing, and provide the grounds for designing interventions congruent with nursing's nature. The study adds to the nursing body of knowledge as it addresses perceived health information needs surrounding acute illness symptoms, health information seeking behaviors of those who sought care in an ED after searching for online health information specific to their chief complaint, and begins to answer the question of whether there is a relationship between online health information seeking and utilization of the health care system. The proposed research is also significant in that ED patients comprise a large proportion of those seeking health care. It is also recognized that many ED visits are not appropriate and as such, it is imperative that research examine the potential role of that online health information plays in the decision to seek health care in the ED. Identification of how people use health services based on information found can ultimately direct to appropriate levels of service or more appropriate information sites.

With a program of research that is focused on advancing nursing science investigating online health information seeking and health service utilization, this study serves as a preliminary investigation of the newly conceptualized model as an organizing framework for examining online health information seeking in ED patients with acute symptoms. The results from this study and the newly developed model are anticipated to serve as a foundation for other nurse researchers to conduct further research that supports, refines and extends the newly developed model, thereby generating further nursing knowledge.

## Significance for Nursing Practice

Patient education is a pivotal nursing role. With emerging technologies and the prolific amount of online heath information available, nurses need to be aware of how and where patients are obtaining health information and to help ensure they are making appropriate decisions based on credible health information to enhance, not compromise, their own health. Nurses also need to have knowledge about the health information patients use to make decisions. This awareness and knowledge guide the nurse in effectively educating patients and supporting their medical decision-making (Cutilli, 2010). Seeking health information can provide an opportunity for a person to be a more active participant in their own health care and work collaboratively as a health care partner. However, if persons are using health information in an attempt to determine the severity of acute illness symptoms or to resolve their own health status, they need to use credible sites referenced by actual health care providers such as health care facilities, government organizations, or educational institutions. By not seeking information from sites that are deemed credible or not seeking medical services when they are actually needed, a person could significantly delay necessary medical care and, ultimately, experience detrimental health consequences.

Educating patients on how and where to obtain correct information about health is a significant nursing function. This research may play a role in providing direction to nursing practice by providing greater understanding of person's quest for information and identification of potential educational interventions for consumers.

In summary, acute illness is common and ED patients represent a large group for whom education and policy initiatives could be developed. Inquiry surrounding ED patients have not yet been fully studied in relation to health information seeking combined with utilization of ED services. Once these findings are obtained, future studies could then focus on patient's perceived expectations and satisfaction with services rendered. If providers become more aware of what their patients expect after conducting an online information search, providers could work in conjunction with patients and facilities to provide educational information on hospital based websites so consumers are well-informed with credible health information and assist patients in making healthcare utilization decisions that are cost effective while at the same time, better meeting consumer needs.

# CHAPTER 2 REVIEW OF THE LITERATURE

A model was developed that linked the tightly interwoven concepts of Individual Characteristics (Demographics), Need State (Symptom Characteristics), Information Gathering and Seeking Medical Services (ED use) in the context of online health information. This dissertation study was designed to investigate these variables in combination and also examines the outcomes associated with online health information gathering; that is, what actions were taken after information gathering when a specific acute, non-urgent symptom occurs. The purpose of this chapter is to provide an overview of general Internet access and use, as well as a synthesis and critique of research conducted in the areas of: 1) the use of the Internet for health information seeking, 2) online health information gathering strategies, and 3) consequences of online health information gathering. Finally, key gaps in knowledge will be discussed as a foundation for the research.

## General Development and Use of the Internet

In order to understand use of the Internet as we know it today, it is necessary to first look to the advent of the Internet and the advances in Internet capabilities over time. The following section provides a historical overview of the origins of the Internet and the evolution through present day usage.

## Historical Development of the Internet

***1950's.*** In the 1950's, computers were massive in size and virtually unknown by the general public. Computer processing power was minimal and there was no way to link computers or networks together. In 1958, President Dwight D. Eisenhower created the Advanced Research Projects Agency (ARPA) as a direct response to Sputnik's launch.

ARPA's purpose was to give the United States a technological edge over other countries, and ARPA's mission was to advance computer science (Strickland, 2008).

***1960's***. In 1969, the United States Department of Defense employed the company of Bolt, Beranek and Newman (BBN) to create a computer network to connect four computers running on independent operating systems (Kleinrock, 2008). This program was called ARPANET (Advanced Research Projects Agency Network). ARPANET established connections between computers at the University of California at Los Angeles, Stanford Research Institute, the University of California-Santa Barbara, and the University of Utah. ARPANET's purpose was to conduct research into computer networking in order to provide a secure and survivable communications system in case of war (Kleinrock, 2008).

***1970's***. As the network quickly expanded, academics and researchers in other fields also began to use ARPANET. In 1971 the first program for sending e-mail over a distributed network was developed (Strickland, 2008). By 1973, international connections from Britain and Norway to ARPANET were made. Electronic mail (e-mail) represented most of the traffic on ARPANET. The 1970's also saw the development of mailing lists, newsgroups and bulletin-board systems, and the Transmission Control Protocol and Internet Protocol suite (TCP/IP) (http://www.isoc.org/internet/history/brief.shtml). In 1982–83**,** these communications protocols were adopted as standard protocols for ARPANET leading to the widespread use of the term *Internet*. At this time, Internet users were government and military employees, graduate students, and computer scientists.

***1980's***. In 1984, the domain name addressing system was introduced. In 1989, the TCP/IP, went public. However, it was not until many years later that it became widely known or used. The National Science Foundation (NSF) Foundation established the NSFNET, a distributed network of networks capable of handling far greater traffic, and within a year more than 10,000 hosts were then connected to the Internet.

***1990's and beyond***. In 1990, ARPANET ceased to exist, leaving behind the NSFNET, and the first commercial dial-up access to the Internet became available. Also in 1990, Tim Berners-Lee developed a system designed to simplify navigation on the Internet. This became known as the World Wide Web (WWW) (Strickland, 2008). In 1991, the WWW was released to the general public. In 1993, the Mosaic browser was released and its popularity led to the proliferation of WWW sites and Internet users. While many still mistakenly use Internet and WWW interchangeably, the Internet is a global interconnection of computer networks; the WWW is the way to navigate this massive network. Through the WWW, the Internet became much more accessible. Colleges and universities, as well as businesses, began to connect to the Internet; and by 1994, Internet commerce had become a reality (Strickland, 2008).

In 1995, the NSFNET reverted to the role of a research network, leaving Internet traffic to be routed through network providers rather than NSF supercomputers. That year, the WWW became the most popular part of the Internet. By 1997, there were more than 10 million hosts on the Internet and more than 1 million registered domain names (Strickland, 2008).

Today, the Internet is more complex than ever. The Internet connects computers, satellites, mobile and other devices together in a massive network millions of times more intricate than the original ARPANET. Present day life is difficult to imagine without the technologies that have become so ingrained in our everyday lives. Without the advent of

ARPANET, the Internet would not exist as it does today. The Internet provides people with capabilities once thought impossible. The development of the Internet as we know it today is considered one of the most significant technological advances in history that will impact nearly every aspect of life in ways still unimagined.

## General Access to and Use of the Internet

According to the U.S. Census Data, Internet access at the household level has risen dramatically over time. In 1984, the first year the Census Bureau asked about computer ownership, only 8.2% of households reported having a computer. In 2003, that number had risen to 61.8%. In 2011, 75.6% reported having a computer (File, 2013). Additionally, 68% of U.S. adults have a smartphone, up from 35% in 201 Tablet computer ownership has edged up to 45% among adults (Anderson, 2015). In addition to the 93% of homes with a home computer. The average number of connected technology devices is 5.7 per household (Grant, 2013).

In addition to Internet access, use of the Internet has also evolved over time. In the late 1990's, 77% of online users were primarily using the Internet to send or receive e-mail at least once every few weeks. In 2000, searching the Internet for news and weather was a popular use of the Internet. In 2001, the average Internet user spent 83 minutes per day online (Pew, 2010). Today, that number has increased to 2 hours and 8 minutes between time on a computer or other electronic devices. Online activities include nearly every aspect of activities of daily living including communication, gaming, carrying out job duties, watching movies, banking, shopping and education. Overall Internet usage has seen tremendous growth. From 2000 to 2009, the number of Internet users globally rose from 394 million to 1.858 billion (Market Information and Statistics, International

Telecommunications Union, 2009). As of 2013, the number of Internet users worldwide was 2.75 billion (http://www.statista.com/statistics/273018/number-of-internet-users-worldwide/). According to the most recent Pew Internet and American Life Project, the most comprehensive source of information about the use of the Internet, a January 2014 survey reveals 87% of U.S. adults use the Internet. Only one in five U.S. adults do not go online (Fox & Duggan, 2013).

## Demographics of Internet Users

According to the Pew Report (2011), 97 % of 18-29 year olds are Internet users; 93% of 30-49 year olds use the Internet. Of those 50-64 years of age, 88% are Internet users and those 65 and older, 57% use the Internet. Eight-seven (87%) of males and 86 % of females are Internet users (Pew, 2011). Ethnicity of Internet users include 85% of White/Caucasian, 81% of African Americans, and 83% Hispanic (Pew, 2011). Internet usage by education level shows 76% of those with a high school education or less are Internet users. Those with some college education 91% and college graduates comprise 97% of Internet users (Pew 20,11) Statistics for income of Internet uses also indicate that over 75% of those with less than a $30,000 income annually use the Internet (77%). Persons with an income in the $30,000 to $49,000, 85%. 93% of those with an income of $50,000 to $74,900 are Internet users, and 99% of those with an income of $75,000 or greater use the Internet (Pew, 2011). Internet users are from all geographic classifications. Rural users comprise 83% of the demographic; Suburban users 87%, and users in Urban areas 88% (Pew, 2011). Currently, age and education are the most significant predictors of Internet access, followed by health and disability status (Fox, 2011). Early studies found a strong digital divide with users being younger, better educated, and at higher income levels

(Murray, et. al, 2003; Rice, 2006 in Tustin, 2010). Other studies suggest that once Internet access is provided, demographic factors no longer matter (Brodie, et al., 2000).

These statistics indicate that Internet users are highly represented in all demographics including age, gender, education, income levels, and geographic settings and have been clearly identified. Although demographic information can begin to provide researchers with information about access and who is using the Internet, the question still remains on how Internet users are utilizing the information found. These data provide evidence that the topic of online information seeking has been and is a fertile ground for researchers and there is equity among demographic groups.

In addition to general access to, usage of the Internet and demographics of Internet users, another area that has not escaped the eye of researchers is related to Internet health information seeking. Internet health information seeking is a complex phenomenon that paves the way for scientific inquiry in any number of directions. The following sections will provide an overview of the history of health information seeking on the Internet, the prevalence of Internet health information seeking, and the strategies used by those seeking Internet health information.

## History of Health Information Seeking on the Internet

Research on Internet health information seeking has evolved over time as accessibility to the Internet and Internet capabilities have advanced. Initial research starting in the late 1990’s focused on Internet access and the "digital divide" (Hargittai, 2002; Hargittai, 2003; vanDijk, 2006; Rainie, 2013). This divide was between those who had computer access and those who did not. The trend then shifted to the credibility of health information found on the Internet (Dutta-Bergman, 2003; Eastin, 2001; Eysenbach &

Kohler, 2002; Health on the Net Foundation, 1997, moving to health literacy of those using the web AHRQ, 2004; American Library Association, 2008; Egber & Nanna, 2009; Wilson, 2003; Bodie & Dutta, 2008; Sarkar, Karter, & Liu, 2010).

Concentrated research, conducted by a variety of disciplines, continues to focus on who uses the Internet for health information and the role the Internet information plays in health. Past research indicates there are demographic factors associated with health information seeking and increased use of health related information arise by age, sex, education and race (Freimuth, et al, 1989). Older individuals engage in less health information seeking (Cotton & Gupta, 2009). Higher education levels correlate with more health information seeking (Turk-Charles, 1997). Studies comparing the demographics of Internet users with nonusers have identified age, education, gender and socioeconomic status as factors associated with online information seeking (Broom, 2008; Chen & Siu, 2001; Murray, et al., 2003 in Tustin, 2010). Women, non-Hispanic whites, younger adults, and those with higher levels of education and income are more likely than other demographic groups to gather health information online (Fox, 2011)**.** Studies on this topic began around 2000 and have dramatically increased each year since then, with a marked rise from 2005 forward.

## Prevalence of the Use of the Internet for Health Information

As early as 1997, 41% of U.S. Internet users had gone online to access healthcare information resources (Katz & Aspden, 2001). In 2012, the first time Pew asked people to think about their online health activities in the past 12 months, 72% of Internet users say they looked online for health information within the past year. Currently, 83% percent of Internet users have looked for health or medical information online (Pew, 2013). Health information remains one of the most important subjects that Internet users research online (Fox, 2011). McMullen (2006) and Gallagher et al. (2008), report the majority of health related Internet searches by patients for specific medical conditions. It has been suggested that online health information is often used to supplement information given by health providers or to clarify information. It would appear that people are seeking health information online to become more knowledgeable about health matters, especially chronic conditions and complaints. According to Lemiere et al., continued research is necessary in order to understand why the general public is making even greater use of the Internet as a preferred source of information on health (2008).

People also need health information in order to be involved in their own healthcare; this information is essential when making a decision as to whether or not seek care. The widespread availability and accessibility of online health information allows people to become informed, provide additional coping strategies and offers a method to become more knowledgeable and more engaged in one’s own health. Results of a World Health Organization (WHO) eHealth survey indicates that 29% of those who had accessed health information found on the Internet used it to decide whether they needed to see a doctor (Sorenson, 2008).

## Information Gathering Strategies for Online Health Information

As part of the Pew Internet and American Life Project 2012 survey, results show that 77% of online health information seekers, or eight in ten U.S. adults say they began their last Internet search session at a search engine such as Google, Bing, or Yahoo, with one billion Google searches conducted every day (Pew, 2012). This finding is consistent with the Pew Research Center dating back to 2000, the year of their first health survey. It is also important to note that the first results found when using a search engine is significantly more likely to be accessed by inexperienced health information seekers (Laurent & Vickers, 2009; Eysenbach & Kohler, 2002; Hansen, Derry, Resnick, & Richardson, 2003). Almost 80% of users search on multiple sites (Fox 2006). A strategy used by another 13% of online health information seekers say they began their information search at a site that specializes in health information, such as WebMD; 2% begin their information search at sites such as Wikipedia (Pew 2014). As the percentage of those beginning their search for health information utilizing Wikipedia is low, there is limited research on Wikipedia's role as a source of health information (Laurent & Vickers, 2009). Although only 1% of online health information seekers say they begin their search at a social network site such as Facebook, Choudhury, Morris and White (2014) reported that social media is rapidly emerging as not only a platform for sharing, but even seeking health information. Fox and Jones (2011) indicate that as many as 39% of online health information seekers are also social media users. Users are following their contacts' health related experiences and share health related concerns and comments. Twitter has also been used to post health related questions. These exchanges are identified as particularly important in providing new information, and social support, particularly important in patients with chronic conditions (Choudhury, Morris, & White, 2014).

## Historical Overview of Reviewed Literature

A considerable body of literature, conducted by various disciplines including nursing, medicine, communications, psychology, and library science, exists surrounding the complex phenomenon of online health information seeking. The reviewed literature on health information seeking typically focuses on the act of information seeking itself. Early studies address five main dimensions: a) conditions of accessibility to the Internet and its information content (Cotton & Gupta, 2004; Duffy, Winbush, Reece, & Eadie, (2003); b) the quality of specialized sites and their content; c) user characteristics (Dickerson, et al., 2004); d) familiarity with and uses made of the Internet and the information consulted and e) the impact of these uses in terms of learning or action (Lemiere, Pare, & Harvey, 2008). The proposed research addresses each of these dimensions but in a combined format.

Another previous research focus has been on online health information seeking once a diagnosis has been made and online information seeking in those with chronic health conditions. Studies address use of online health information usage in terms of coping with a chronic condition, alternative therapies and symptom management of a known, diagnosed condition. While not an exhaustive list, studies can be found to address any number of chronic illnesses. Examples include patients with chronic conditions (Ayers & Kronenfeld, 2007); cancer (Andreassen, Randers, Naslund, Stockeld & Mattiasson, 2006; Tian & Robinson, 2009; Ziebland,

et al, 2004, Peterson, 2003; patients with stigmatized illness (Berger, Wagner, Baker, 2005), patients seeking genetics information (Taylor, Alman and Manchester, 2001); and older adults with arthritis (Tak & Hong (2005). This research will add another dimension in online health information seeking in addressing acute, symptom specific, undiagnosed conditions. Comparisons can then be made between those using online health information for acute versus chronic conditions in symptom identification and management.

## Literature Relevant to Study Model

Because of the abundance of research conducted by various disciplines related to online health information seeking from a variety of perspectives, including specific demographic groups with specific healthcare information needs, the studies selected for inclusion are primarily focused on the four concepts in the model under study: Individual Characteristics (Demographics), Need State, Information Gathering and Seeking Medical Services in order to determine the state of the science surrounding online health information seeking combined with health service utilization. In most cases, each of these elements were addressed, even if in a cursory way.

An ongoing, comprehensive computer based search of the electronic databases from years 2000-2016 was done using the keywords: Internet health information, online health information, online health information seeking, and healthcare utilization. The review also included examination of the references of the published studies, for additional research studies not found through the electronic search. Studies were limited to those in the English language. The studies included in the review appeared in a variety of journals including communication, health education, nursing, medicine and informatics, illustrating how far reaching this topic can be, and of interest to a variety of researchers and health care providers.

## Reviewed Studies Combining Information Seeking and Healthcare Utilization

The following eight studies were chosen for inclusion in the selected review as they addressed one or more elements of the proposed model concepts under study. The studies are described, limitations addressed, and explanation of relevance to the proposed study provided.

In 2008, researchers Bouche and Migeot decided to study the relationship between parental use of the Internet to seek health information and self-reported primary care consultation frequency for their pre-school age children in France. A cross sectional survey design was used to collect data on parents, children, frequency of primary care visits, health information sources and methods used to seek health information on the Internet. Results from a 49% response rate (n=106) did not support the hypotheses that there was a relationship between use of the Internet to seek health information and the number of self-reported consultations. Limitations included lower response rates in non-French speaking families with a lower socio-economic status which may have accounted for an overestimation of health information seeking on the Internet and an under report of primary care visits. “Widespread utilization of the internet raises some questions about its impact on health behavior, health service utilization and finally on health outcomes…and no sufficient data is available to answer the above questions, in particular the relation between seeking health information on the internet and health care utilization” (Bouche & Migeot, 2008). Model concepts addressed: Individual Characteristics, Information Gathering, Seek Medical Services. Although findings from this study did not support the hypotheses, the study was included as it illustrates the need for further investigation on the relation between Internet health information seeking and health care utilization.

A 2002 study by Budtz and Witt was conducted to describe where patients in a Danish general practice obtained information about health and disease, how they prepared for a visit to the general practitioner (GP) with special reference to the Internet. This study resulted from the author’s searching for studies on how patients seek health information as part of preparation for a visit to the GP, especially the extent of the information that comes from the Internet. They found that while many studies addressed Internet usage and quality of health related websites, no references were found concerning preparation for the visit (Budtz & Witt, 2005). In this study, a structured interview guide was used to interview 93 consecutive patients in the waiting rooms of four general practice offices consisting of 10 doctors after the patient completed their visit with one of the practices located in a rural area. Of the 93 patients, 62% were women. Ages varied from 16-90 years with 40 years of age being the mean. Of all 93 patients, 45 were Internet users with 80% accessing the Internet at home. Thirty-seven (37%) percent had been on the Internet because of the current problem. Half of the patients had used the Internet for health information at least once per month. Model concepts addressed: Individual Characteristics, Information Gathering, Seek Medical Services. This study was selected for inclusion as there is consistency with the data related to demographics of Internet uses. The study was also included as one of the primary concepts in the proposed study is how information is sought for a current complaint and the role the information found plays in seeking medical services. Also supported is that the Internet is used in response to a specific problem requiring health service utilization, similar to this research with patients with acute symptoms who may be presenting to the ED after searching the Internet for information about a specific problem.

A study by Diaz (et al.) in 1999-2000 was conducted to determine the percentage of patients enrolled in a primary care practice who use the Internet for health information, to describe the type of information sought, to evaluate patient’s perceptions of the quality of information, and to determine if patients’ who use the internet for health information communicate the information they find with their doctors. A self-administered, mailed survey was sent to 1000 randomly selected patients from the billing files of a primary care, internal medicine practice. The 516 questionnaires were returned yielded a 56% response rate. The average age of participants was 47 years old, 56% of the participants were female, and 53% of participants indicated they used the Internet for health information, 68% of participants indicated they sought information regarding nutrition and diet, 58% of participants looked for information regarding side effects of drugs, 41% for information about complementary and alternative therapies and 41% for a second opinion.

Limitations of this study include the sample taken from a homogeneous demographic that consisted primarily of insured, Caucasian, English speaking, higher educated, higher socioeconomic background subjects. Model concepts addressed: Individual Characteristics, Information Gathering, Seek Medical Services. Again, demographics of users in this study are consistent with national averages. Cited within this study was a 2000 study by O'Connor and Johnson with private practice gastroenterology patients. Twenty-five percent (25.5%) of patients reported searching the Internet for health information but they did not include whether or not the patient shared the information they found on the Internet with their health care provider. Model concepts addressed: Individual Characteristics, Information Gathering, Seek Medical Services. Although specific to gastroenterology patients, a relatively homogeneous group, the study was mentioned to illustrate another subset of the types of populations being studied.

A descriptive study by Dickerson (2004) looked at the proportion of patients in three urban ambulatory clinics in Buffalo, NY who used the Internet for health seeking purposes. The study was conducted for the purpose of understanding online health information search behaviors. The three clinics selected by the researchers served diverse populations. A sample was taken from a university based practice site that provides care for the working insured, a primary care clinic, and a public clinic serving mainly the poor and uninsured. A total of 315 participants were interviewed after a random numbers table selection process. Interviews lasted on average of 5-10 minutes and included demographic information, number of current prescriptions, questions about Web access and use of the Web for health information. Patients were asked specific questions about number of times they go online per day, how they access the Web, use of Web to obtain health related information, whether it was for themselves or someone else, as well as questions about the types of medical Web sites access. They were questioned about the Web information source, whether they learned something new, and whether they shared this information with their health care provider. Finally, they were asked whether the information affected their clinic visit.

A key finding identified in this study is that use of the Internet for health information was limited among more disadvantaged patient groups. Approximately 53% of respondents reported using Web or e-mail in the past year and 68% (33% of total sample) of those who accessed the Web used it to search for health information. The two most commonly cited search areas included information about a physical illness and nutrition/fitness. Education and race significantly predicted online health-seeking behavior when considering all factors in the study. Many patients (22%) relied on friends and family to navigate the Web, and 45% of patients reported that the information that they sought was unrelated to their clinic visit. Model concepts addressed: Individual Characteristics, Information Gathering, Seek Medical Services.

The focus of a 2008 study by Iverson, Howard, and Penney (2008) was Internet use in primary care patients and the effects of this patient Internet research on the patient-physician relationship. A brief eight-question survey was created to determine the prevalence of online information seeking by patients in three osteopathic medical clinics (two internal medicine and one family practice) outside Detroit. Questionnaires were given to all patients. Demographic data were obtained. No information was collected regarding health status. The response rate in this study was 51%. The majority of respondents were between the ages on 31-60. Typical with findings in other studies, patients reported using the Internet to find health information as well as indicating a health behavior change. Looking at the patient-physician relationship, the majority (74%) of the patients felt their physicians would be willing to discuss information they found online. Model concepts addressed: Individual Characteristics, Information & Gathering. Lacking from this study include information regarding need state, or information search in response to a specific complaint. Also lacking was information regarding the role information seeking played in seeking health services.

In 2006, Liszka, Steyer and Hueston studied the extent of health seeking on the Internet by their academic family medicine practice. Each of the 203 patients recruited from a consecutive sample participated in a short survey while waiting to see their provider. The aim of the study was to quantify and characterize Internet access to determine the feasibility of establishing a website for patient’s use. The initial five questions inquired about internet use including access, use of Internet for health related information, whether the information was shared with their physician and whether the patient made a behavior change based on information found. Demographic and socioeconomic information was also collected. Results indicated that Internet plays a major role, even in a typically lower socioeconomic, predominantly non-Hispanic black population. While 50% of patient's shared Internet information with their providers, 73% stated that this information helped them make a medical decision (Liszka, Steyer, and Hueston, 2006). Limitations identified by the authors of the study include of consecutive patients and the recognition that those who were willing to participate may have been more likely to use the Internet. To address this limitation, the authors also administered a short version of their survey (including Internet use, age and race) to an additional 300 patients. These results confirmed that there were comparable percentages (74%) of those who had used the Internet for online health seeking with those that participated in the survey. Model concepts addressed: Individual Characteristics and Information Gathering.

Millard and Fintak (2002) investigated how patients with a chronic illness used the Internet to manage their health. This online survey was conducted with 10,069 participants with 35 chronic conditions, including at least 50 respondents with each condition. Allergies, arthritis and hypertension were the most commonly represented chronic conditions. Patients with gynecological problems, sinus, migraine, arthritis and thyroid spent the most time on line and also described themselves as being in poorer health**.** Results from this study indicate that the Internet is often used as opposed to seeking medical care among uninsured patients or those without access to a primary care physician. Forty-two (42%) of respondents felt that the internet had a major impact on understanding their health problems. These findings suggest the Internet appears to act as a surrogate for medical advice among those patients lacking health insurance coverage or those who find obtaining care difficult. This study was chosen for inclusion as although patients with chronic conditions were surveyed, the sample size was large and a wide variety of symptoms were addressed. Although conditions listed were chronic in nature, many of the reported complaints have implications for acute care. These results could be significant for future research as these are often the same patients who seek care in an Emergency Department or use the Emergency Department as their primary source of health care. Model concepts addressed: Individual Characteristics, Need State, Information Gathering & Seek Medical Services.

The current research investigated information gathering for acute, non-emergent illness symptoms in those patients presenting to an ED for care, it is also necessary to include a brief overview of ED utilization, research conducted in ED settings, and finally studies relevant to ED patients and Internet health information seeking.

## Overview of Emergency Department Utilization and Emergency Department Specific Research

ED's are an integral part of health services in the U.S. For the majority of patients, the ED is used only when confronted with an acute, life-threatening, emergency situations, the originally designed purpose of ED's. For others, the ED is a source of primary healthcare and the only guaranteed access point to medical care (Peterson, 1998). According to Healthy People 2020, more than 40 million Americans do not have a primary care provider. Thus, the ED serves as the gateway to health care for many Americans who may not be able to access services elsewhere. ED's are increasingly being used as a provider for non-urgent care (Shen & Hsia, 2010, Grumbach, Keane, Bindman, 1993; Rust, Ye, Baltrus, Daniels, Adesunloye, & Freyer, 2008).

According to the National Hospital Ambulatory Medical Care 2006 Survey (Pitts, Nisa, Xu & Burt, 2008) there were 119.2 million visits to hospital ED's. Between 1996 and 2006, the number of ED visits annually increased by an alarming 32% (Pitts et al, 2008) with most ED's reporting over-crowding (Koziol-McLain, Price, Weiss, Quinn & Honigman, 2000). One third of emergency visits have been classified as non-urgent or semi-urgent, suggesting that care sought in an ED could be provided in other less costly and more appropriate settings. Appropriateness implies use of the ED for urgent or emergent care that is "when a patient requires immediate attention for an acute illness or injury that threatens life or function and where a delay would be harmful to the patients" (National Center for Health Statistics as cited by McCraig, 1994, p.12). These labels that determine appropriateness are often assigned retrospectively. Non-urgent classifications do not take into consideration the nature and ambiguity of symptoms precipitating the patient's visit to the ED, nor does it reflect the patient's initial perceptions of the urgency. (Gooding et al., 1996). Additionally, according to the Department of Health and Human Services, the average charge for treating non-urgent conditions was up to five times that of a Medicaid-covered visit to a physician's office. Unnecessary ED visits have adverse effects on both cost and efficiency of service delivery and validate the importance of research initiatives examining appropriateness of ED utilization as well as factors that may influence utilization (Gooding, Brannigan-Smith, & Peyrot, 1996).

Studies found on ED utilization focus on overcrowding (Sun, Burstin, & Brennan, 2003), frequent utilization (Chan, 2004; Lucas, 1998**;** Milbrett & Helm, 2008), and delays in seeking care for specific complaints.

As ED patients comprise a large proportion of those seeking health care, and it is recognized that many ED visits are not appropriate, it is imperative that research examine the potential role of Internet health information and the role this information plays in the decision to seek health care in the ED. Acute illness is common and these patients represent a large group for whom policy initiatives could be developed (Matthews & Barnsley, 2003).

## Relevant Studies Combining Internet Health Information Gathering on Seeking Medical Services (ED Usage)

A second computer based search of the communication, social science, medicine and nursing literature was conducted using the keywords: Internet usage, Internet health information seeking, online health information, online health information seeking, ED utilization, and acute symptoms in order to determine if studies similar to the proposed research had previously been done. Limited studies exist examining whether or not information found on the Internet influences patients of any particular demographic or acute illness condition to make health decisions to seek health care, specifically in an ED. The few studies found addressing online health information seeking and ED utilization are described below.

Only four quantitative studies were found that addressed Internet health information seeking in ED populations (Goldman & MacPherson, 2006; Salo, Perez, Lavery, Malnakar, Borenstein, Bernstein (2002); Sullivan, 2009; Pourmand and Sikka 2011). The first, a descriptive, exploratory study by Goldman & MacPherson (2006) found that 56% of parents of children presenting to the ED reported searching the Internet and 8.5% searched immediately prior to the visit. This study was conducted in Toronto over a three-month period. Interviews were conducted with 950 parents of whom 87% reported routine Internet access, 75% reported having an e-mail account, and 60% accessed their e-mail once or more a day. Seventy-three percent (73%) indicated they would like to receive an e-mail containing the results of tests conducted in the ED; 66% of all respondents and 89% of those with e-mail indicated that they would like their child's primary care provider to receive information electronically. The results emphasize the need to guide parents regarding reliable resources online, possibly as part of their ED visit. However, the study did not investigate why the information was sought (related to a specific symptom) or how information found may have contributed to the visit.

Salo et al. (2004) assessed inner city ED patients' use of the Internet to obtain medical information and whether patients had an interest in receiving links pertaining to their medical condition by their ED physician on discharge. A convenience sample of 328 of inner city ED patients were surveyed regarding computer/Internet access, past searches for medical information, and whether they desired medical links provided with discharge paperwork. Of 328 patients completing the survey, 178 (54%) had computers, whereas 150 (46%) had access to the Internet. Seventy-nine (24%) had previously used the World Wide Web (WWW) to obtain medical information, and 26 (33%) of these reported difficulty in obtaining useful information. One hundred ninety-two (59%) were interested or very interested in being provided links to medical sites. Patients more likely to want medical links were younger, college educated, and in higher salary ranges, consistent with Pew Internet and American Life Project. Of the 328 patients completing the survey, 178 (54%) had computers, whereas 150 (46%) had access to the Internet.

A descriptive study by Sullivan et al. (2009) examined ED patients' Internet use for health information and its relation to ED utilization. During two 24 hour periods at four ED's in Boston, consecutive patients 18 years of age and older were surveyed. Of the 530 participants, 67% used the Internet over the past 12 months, 24% never did. Twenty-one percent reported seeking information on the Internet before going to the ED and 46% indicated the information they found on the Internet made them more likely to go. The authors conclude that the majority of ED patients in Boston used the Internet for health information, although older age, African American race and lack of primary care provider were associated with less use of the Internet (Sullivan et al.). This study signifies that ED patients are looking for information prior to seeking ED care. Almost 50% indicated that information found made them more likely to seek care. This statistic warrants further investigation and could be of interest to those working in ED settings.

In 2011, Pourmand and Sikka investigated the impact of online health information and the patient's decision to seek ED care. A convenience sample of 489 ambulatory patients was obtained. The primary measure was to investigate the prevalence of Internet use of online health information in ED patients. The secondary outcome was the influence the online health information had on the decision to seek ED care. Findings indicated Internet access online health information usage in an urban ED population may mirror reported Internet use among American adults (Pourmand & Sikka, 2011). The secondary findings indicate that 15% changed their decision to seek care in the ED. This study most closely mirrors the proposed research and replication of the study and findings could add to the body of knowledge related to those seeking Internet health information and utilization of ED services.

Another study of interest, though not specifically investigating ED patients or utilization of ED services, but relevant to utilization of health services in general, Suziedelyte (2012) investigated how searching for health information on the Internet affected individual's demand for health services. The author utilized the 2006-2009 publicly available survey data from the National Cancer Institute U.S. Health Information National Trends Survey (HINTS) (National Cancer Institute, 2006). The results of the secondary analysis suggest that the effect of Internet health information seeking on health care utilization is positive, large, and statistically significant (Suziedelyte, 2012, p. 1834). Internet health information seeking has a positive effect on the demand for health care and health information seekers demand more health care than non-seekers (Suziedelyte, 2012, p.1834). This increase in health awareness may drive Internet health information seekers to seek health care services. The author suggests this research could be extended whether the relationship between Internet health information seeking and health care utilization varies by the type of health care. In the described analysis, health service utilization was only measured by number of visits to a health care provider over a 12-month period.

From these studies, it is hypothesized that online health information use in ED patients may be reflective of findings related to demographics of Internet users, Internet use and access, online health information seeking amongst the general population, and in those with chronic health conditions. Although, some of the studies date back as far as 10 years, access and usage reported in earlier studies would most likely increase to mirror today's patterns of Internet usage if the studies were replicated today. It is also apparent that ED patients do have Internet access and are Internet users. ED patients are seeking information online and information seeking has been shown to have some influence on the decision to seek health services. It is also evident that patients would like more information from their providers to be more active participants in their own health.

What appears to be lacking from the studies on online health information seeking and ED usage is the Need State and Seeking Medical Services identified as key concepts in the proposed research. Missing is the identification of the actual Need State, conceptually defined as the onset and/or recognition of the acute illness symptom(s) which alerts a person that there is a health concern or interferes with daily functioning. Acute, non-urgent symptoms commonly seen in ED's such as abdominal pain, cough, fever, back pain and headache as well as perceived urgency of symptoms that led patients to first seek online health information and ultimately seek ED care have yet to be investigated.

**Strengths of Research to Date**

The literature reveals that there has been a great deal of research interest in the phenomenon of online health information seeking. Research to date has uncovered that the majority of people access and use the Internet and provides a solid foundation from which to propel the state of the science even further. Research has also revealed that the majority of people seek health care information online and are using this information in some way to make medical decisions, including patients characterized by low socioeconomic and minority status. Studies have also determined that patients would like to be more active participants in their own health care, communicate electronically with health care providers and be provided with credible Internet health information sites. The studies to date have been largely quantitative studies and have included large scale surveys as well as secondary analyses of national survey data. The results of these studies have laid a solid foundation through which further investigation, either through quantitative or qualitative approaches can be done to advance the body of knowledge.

## Limitations of Current Research and Gaps in Existing Knowledge

Because of the broad scope of the topic of online health information seeking in terms of demographics of users, health information topics, health information creditability, health literacy, the research conducted to date may be viewed as relatively superficial in nature and do not necessarily provide an in-depth understanding of the nature of the how these elements all work in concert.

The research to date conducted in the area of online health information seeking is primarily descriptive. While it is first necessary to describe the phenomenon under investigation, there are still subsets of the population that have not been studied, such as ED patients with acute, non-urgent symptoms as most research has focused on chronic, already diagnosed health conditions so further descriptive research can prove to be useful. Based on the number of ED visits, this is a large group that has to date been overlooked when conducting online health information seeking research in order to fully describe and understand all aspects of the phenomenon.

Also notably absent in the reviewed studies is any theoretical underpinnings guiding any of the reviewed studies. Atheoretical research on this topic is abundant, although the topic of online health information seeking lends itself to many theories within nursing, psychology, communications and library science. According to Donaldson and Crowley (1978), theories or knowledge outside the discipline of nursing can enhance the process of inquiry as it pertains to the phenomenon.

Additionally, little attention has been paid to health care utilization as an outcome of online health information seeking, although many investigators have alluded to this being the next step. It is time to determine whether or not there is a causal relationship or outcome/consequence of health service utilization once information is found. It may soon be time to begin what is known already known about online health information seeking and correlate specific conditions or to determine cause and effect relationships.

Finally, another major limitation to the current state of the science is that currently, there is no consensus in the literature on whether Internet health information is a substitute for or complement to health care (Suziedelyte, 2012). There are two schools of thought on this--the first is that related to the amount of information now available to the general public, the Internet may reduce the frequency of people's visits to health professionals. By self-diagnosing and treating themselves at home may reduce health care costs crested by unnecessary visits to a health provider. On the other side of the argument, due to the uncertainty caused by illness, health professionals are still needed in order to assist in interpreting information found, online health information may make people more concerned and may increase the frequency of visits to health professionals (Lee, 2008).

## Gaps in Research

Although a large body of descriptive, atheoretical research on online health information seeking exists, much of the research to date in this area has focused on patients with chronic health conditions. What has not been studied and appears to be a gap is health information seeking in patients with acute symptoms, especially those with the acute, non-emergent symptoms often presenting to an ED. Additionally, there is limited research on need states and seeking medical services, concepts in the present model, based on online health information gathering.

If researchers want to expand the body of knowledge and truly narrow the research gap, it is necessary to examine the reasons why people turn to the Internet for their health care information needs, their assessments of this experience and the resulting actions spurred by the information found (Ybarra & Suman, 2008). According to the Pew Report (2012), 70% of those seeking information online indicated information found influenced their decision of how to treat an illness or condition. It has also been identified that information found on the Internet influences the decision to seek care but the type or setting of care has not been investigated. What also remains unknown is whether the decision was the appropriate one. Bouche and Migeot (2008) suggested that while there has been research on online health information seeking, little is known about the *consequence* of health information seeking on health care utilization. Seeking care in an ED based on information found online will be studied from an outcome perspective and provide insight into the consequence of health information seeking, the piece missing from the literature to date.

In 2013, there were 13 billion Internet connected devices and it is anticipated that by 2020, that number will reach 50 billion (Cisco, 2013). Given the growing technologies and the importance of the Internet and Internet health information in people's everyday lives, there is need to deepen our understanding of Internet health information gathering and the resulting action in order to close the gap and develop tailored interventions that will aid people in their quest for health information, information gathering, selection of credible health information sites and guide them to appropriate levels of health service.

This study *expands on* and *add to* what is already known about online health information gathering and usage and begins to address two gaps in the information seeking literature--1) ED patients, an understudied population, and 2) online information seeking in those patients with acute symptoms, another understudied topic. The study links these two understudied areas--ED patients and those patients with acute, non-urgent illness symptoms. This information, coupled with information obtained about ED usage, may potentially yield new insight to ED usage.

As the access to, the amount and types of health information available and the ever expanding technological capabilities of ways to connect to the Internet, understanding online health information seeking and usage in all patient settings and conditions is necessary. This will enable nurse researchers, and other researchers alike, to better meet the needs of all types of patients with varying demographics with acute conditions who use the Internet in their quest for health information. Through the numerous studies that address online health information seeking in various populations and in those with specific health conditions, many report information found affects decisions about health care and health care decision making. In spite of this, upon review of the expansive body of literature on health information seeking, revealed is a scarcity of information related to the use of online health information as it relates to or results in utilization of ED health services. Another identified gap is a group that is noticeably absent—those patients with a yet undiagnosed condition who may be seeking online health information. Key research questions are raised such as whether patients with acute symptoms are seeking online health information and use this information in the same way as those with chronic conditions, whether demographics of information seekers with acute symptoms are similar, and if patients with certain physical complaints are more likely to seek online health information. Another potential question was whether patients seeking care in the ED utilize information or seek information in the same manner as they primary care/clinic counterparts.

## Purpose and Significance of Proposed Research

The purpose of this study was to examine the Internet health information gathering practices of Emergency Department (ED) patients when experiencing acute, non-urgent illness symptoms. While studies are abundant that address general online health information seeking, the use of online health information once a diagnosis is made, or to manage chronic health conditions, little remains known about health information use in those with acute symptoms and what is the next step once information is found.

The expected outcome from this study was to yield new insight and attempt to narrow the gaps in the body of knowledge regarding online health information seeking in the context of the ED in patients with acute, non-emergent symptoms. If it is identified that online information seeking is a contributing factor to unnecessary ED usage, (i.e. seeking ED care that is not necessary) then other more cost-effective treatment locations can be identified to better meet patient needs.

The Internet is a dynamic, interactive, and continually evolving medium and has become an established source of health information for both consumers and health professionals alike (ECDC, 2011). Web pages, email, instant messaging, forums, blogs, and wikis afford people the opportunity to seek information about any aspect of health or health related concerns. Those seeking online health information are afforded anonymity and the opportunity to utilize the 24-hour availability of the Internet, allowing the ability to research a problem at any time of the day or night. As persons actively search for information about health, they take an increasingly active role in their own health and self-care. Seeking health information proves to be a highly personal activity driven by situational and contextual factors (Abrahamson, Fisher, Turner, Durrance, & Turner (2008).

As national health care costs continue to rise and policymakers work diligently to make the health care system more efficient, it is important to gain a better understanding of the characteristics (demographic and symptom) of individuals who use an ED in place of other types of ambulatory care settings for acute, non-urgent symptoms and more importantly, whether a relationship exists between information found and the decision to seek care in an ED. For policy and practice, results could be invaluable in establishing short and long term health goals for information seekers, as well as begin to identify any adverse effects of specific Internet information (i.e. delays in seeking treatment) when evaluation is time sensitive.

As technologies continue to grow, Internet health information has the potential to improve health and health outcomes. Widespread availability, increased access and use of interactive health applications demand more research in all areas of health information use and health care utilization (Jimison, Adler, Cove, Mulley, & Eng, 1999).

# CHAPTER 3 METHODS

The purpose of this study was to examine the Internet health information gathering practices of Emergency Department (ED) patients when experiencing acute, non-urgent illness symptoms. This chapter describes the research methods used for this study. The design, setting and sample, definitions of major variables, description of instrumentation, as well as procedures for data collection, data analysis, and protection of human subjects are described.

## Research Design

A descriptive/correlational design was used to address the following specific aims.

1. Determine the characteristics of Internet health information gathering sources (e.g. type of sites visited, time spent) accessed by non-emergent ED patients with acute illness symptoms.
2. Identify the extent to which individual characteristics (e.g. demographics) and need state (e.g. acute symptom characteristics) influence Internet health information gathering in non-emergent ED patients.
3. Identify the extent to which Internet health information gathering influences seeking medical services (e.g. decision to go to ED).

## Setting & Sample Setting

The setting for this study was Botsford Hospital in Farmington Hills, MI (currently Beaumont Farmington Hills), a Level II ED serving the Metropolitan Detroit area. A Level II facility, as designated by the American College of surgeons, provides emergency and surgical services on a 24 hour a day/7 day a week basis. The 330 bed facility sees approximately 60,000 patients in their ED annually, and provided a pool of over 150 potential participants per day.

**Sample & Sampling Plan**

The target population for this study was non-emergent ED patients who sought Internet health information related to their presenting symptom(s) prior to presenting to the ED who met the following additional inclusion criteria:

- All ambulatory patients between the ages of 18-80, regardless of complaint;
- Triaged as urgent or non-urgent;
- In no acute distress related to airway, breathing, or circulation;
- Self-reported level of pain of less than 5 on a 0-10 scale;
- Able to read and speak English
- No cognitive or neurological impairment including being under the influence of drugs or alcohol;
- Physically and mentally capable of completing a survey independently or with assistance of the researcher or research assistants;
- Willing to voluntarily participate

Rationale for inclusion/exclusion criteria: A non-probability, convenience sampling plan was used. However, in order to reduce the possibility of selection bias, recruitment time periods were stratified over a seven-day period during morning, afternoon and evening (day, afternoon and midnight shift) during data collection to account for influences that would bias results. Eligibility criteria were left intentionally broad to promote a wide range of participants and medical conditions since little is known about online health information gathering by ED patients with acute, non-urgent illness symptoms. Patients between the ages of 18-80 are reflective of the age of majority in the state of Michigan and also capture the demographics of Internet users: 18-29 (94%); 30-49 (87%); 50-64 (74%); and 65+ (41%) (Pew, 2011). Those patients triaged as urgent or non-urgent who presented during the selected time frames were invited to participate, regardless of chief complaint. According to the Emergency Severity Index endorsed by the Emergency Nurse's Association, urgent is defined as requiring treatment within a few hours; non-urgent is used in regard to relatively minor conditions that do not require the resources of an ED; the conditions need attention but time is not a critical factor. Inclusion criteria included: willingness to complete the survey, ability to read and speak English, no cognitive or neurological impairment, or under the influence of drugs or alcohol.

Exclusion criteria included patients triaged as emergent or having a potentially life threatening condition, or conditions that compromise airway, breathing or circulation that require immediate medical attention. Also excluded were those in the custody of law enforcement or patients arriving by ambulance. Although it is possible that patients arriving by ambulance may have also consulted the Internet before arranging for ambulance transport, these patients typically have a different entry point in to the ED and were not accessible to the researcher. The data was collected once for each participant, that is, there were no repeated measures.

Sample size justification. A logistic regression with a sample size of 242 participants achieves 80% power at a 0.05 significance level to detect an odds ratio of 1.5 and a squared multiple correlation coefficient 0.1 (Hsieh, et al, 1998). However, taking into account the likelihood that some data may not be usable due to problems with incomplete or invalid responding, a target sample size of approximately 300 was attempted to be recruited. At the end of data collection, the final sample was comprised of 74 participants.

## Instruments/Measurement

The major variables in this study included the following predictor variables: Individual Characteristics (Demographics), Need State (Acute Symptom Characteristics including symptom type, symptom duration and perceived severity), Information Gathering (online health information seeking). The primary outcome variable is Seeking Medical Services (ED use).

Although several instruments exist that address Internet health information seeking or health service utilization, no single instrument captured the key variables to be examined in this study. Further, the use of several separate instruments was deemed to be problematic in the ED setting where participants may have limited time to complete the surveys. Therefore, the investigator developed the Internet Health Information Gathering and ED Usage Questionnaire (IHIGEDUQ) that was be used in the study (Appendix A).

## Predictor Variables

**Individual Characteristics.** A key predictor variable of interest was individual characteristics. Individual characteristics were defined as the physical and psychosocial qualities that describe an individual. For the purpose of this study, the Individual Characteristics were the *Demographic Characteristics*.

**Demographic Characteristics.** Demographic characteristics are conceptually defined as background information that provides the social characteristics of a subject. Demographic characteristics were operationalized through responses to the following seven questions on the survey:

- What is your age?
- What is your gender?
- What is your ethnic background?
- What is your educational level?
- What is your income level?
- Do you have a primary care provider (e.g. physician, Nurse Practitioner)?
- Do you have health insurance?

**Need State.** Need state was conceptually defined as the onset and/or recognition of the acute illness symptom(s) which alerts a person that there is a health concern or interferes with daily functioning. Need state was operationalized by responses to the following survey instrument question:

- Please describe the problem you are having or the main reason for your ED visit today.

**Symptom Characteristics.** Symptom characteristics were conceptually defined as the timing of the Need State (e.g. onset and duration of acute illness symptoms) and the patient’s perception of the severity of the Need State. Symptom characteristics were operationalized through responses to the following three survey instrument questions:

- How long have you been experiencing the problem or symptom(s) you are having that led you to come to the ED today?
- On a scale of 1- 5, with 5 being the most serious/severe, rate your perception of the severity of the problem you were experiencing;
- Do you consider this problem to be: Emergent Urgent Non-Urgent

**Information Gathering.** The Consumer Health Information Resource Service (CHIRS) definition for Internet Health Information Seeking was used as the conceptual definition for Information Gathering. This is the "*intentional, active efforts to obtain specific information above and beyond the normal patterns of media exposure and use of interpersonal sources"* (Atkin, 1973; Griffin, Dunwoody, & Neuwirth, 1999). It includes "any non-routine media use or interpersonal conversation about a specific health topic and thus includes behaviors such as viewing a special program about a health-related treatment, using a search engine to find information about a particular health topic on the Internet, and/or posing specific health-related questions to a friend, family member, or medical practitioner outside the normal flow of conversation" (Niederdeppe, Hornik, Kelly, et al., 2007, p. 155).

Information Gathering was operationalized by the following six questions on the survey:

- Do you use the Internet for general information about health, such as diet or exercise?
- How soon after your problem or symptoms began did you begin to look for information?
- Did you begin your search for information on a search engine?
- Approximately how much time did you spend looking on the Internet for information about your problem/symptom?
- Please include the names of any sites you remember visiting.
- Did you talk with anyone about the information you found?

## Outcome Variable

**Seeking Medical Services** was conceptually defined as presenting to the ED for care after gathering online health information regarding a specific, acute illness symptom. Seeking Medical Services was operationalized by responses to the following five questions on the survey:

- Did you try to treat this problem yourself at home prior to coming to the ED?
- Did you consider any other locations of care for this problem?
- Within the past 12 months, not counting today's visit, approximately how many times have you been to an ED for care?
- Did you use the health information you found on the Internet to determine whether you should come to the ED today?
- Did you change your decision to come to the ED today based on information that you found on the Internet?

## Pilot Testing of Investigator Developed Instrument

The newly investigator developed questionnaire was pilot tested with a sample of 10 participants reflective of the demographics of potential ED study participants. All participants were able to read and write English. The pilot testing of the questionnaire was done by the researcher on an individual basis prior to the start of data collection. The setting for the pilot testing was at a mutually agreeable location determined by the researcher and the participant. The purpose of the pilot testing was to improve the quality and efficiency of the questionnaire. The findings of the pilot study could reveal deficiencies in the questionnaire that could be addressed before time and resources are devoted to the main study. Based upon the feedback provided by the pilot sample, no revisions to the survey were found to be necessary.

## Procedures

### Recruitment Procedures

IRB approvals were obtained from Botsford Hospital after presenting to their IRB full board. Approvals were then obtained Wayne State University. Flyers advertising the study were posted in the ED lobby and ED registration area to help maximize recruitment. Recruitment of participants was done by both the ED residents and the PI. Once the potential participants have been enrolled, an information letter and informed consent was provided to the potential participant (Appendix B). The information letter contained the researcher’s name and educational information, including university affiliation, the request to participate in the study, the time commitment expected, and how data were to be collected. Informed consent included anonymous, voluntary participation and possible risks and benefits of participation were explained. Once a participant affirmed interest in continuing, they were consented by the researcher and then screened to determine eligibility as outlined by the inclusion criteria. Once the inclusion criteria were met, the participant was then formally enrolled in the study, and the survey administered, either independently by the participant or with the assistance of the researcher prior to being seen or discharge or transfer from the ED.

### Data Collection Procedure

Once triaged and registered as patients in the Botsford ED**,** all patients meeting inclusion criteria were approached for inclusion and participation in the study by the research assistants or researcher. The primary investigator or research assistants introduced the patients to the study and determined eligibility. All data were collected by the researcher and two research assistants who were ED Medical Residents The residents were employed by the hospital where the data was collected. The responsibilities of the research assistants were to assist in the identification and recruitment of participants, obtain informed consent, provide participants with both verbal and written explanations of the study, and assist with the data collection. To insure uniformity, research assistants were trained by the researcher and provided with a script that outlined recruitment and data collection procedures. Survey questionnaires were given to participants to be completed while they waited to be seen or while in the treatment area, condition permitting. The questionnaire took approximately 10 minutes to complete.

### Data Management

All data were managed by the principal investigator. The completed surveys were stored in a locked, portable file box prior to data entry. Survey data were entered into SPSS on an ongoing basis as the surveys were collected. Upon completion of entering all survey data, each survey was double-checked with the data that had been entered into SPSS for verification of correct data entry. Verification of correct data entry was also done prior to running SPSS analyses by the PI.

The data collection instrument did not include any personally identifying information to link responses back to participants. The potential risks to the patients who agreed to participate in the study were minimal. All documents will be stored for three years in accordance with the Wayne State University College of Nursing Office of Health Research policy.

## Data Analysis

The SPSS program (Version 22) was used for all statistical analyses and for writing the scientific report of the quantitative data. Descriptive statistics were used to obtain the summary measures for all data including a description of the sample characteristics. Descriptive statistics included means, medians, modes, ranges, interquartile ranges, and standard deviations for continuous variables. Categorical variables were statistically represented in frequency distributions, percentage distributions, and graphical illustrations. For all tests of statistical significance, a minimum p-value of .05 was used.

**Specific Aim 1:** Determine the characteristics of Internet health information gathering sources (e.g. type of sites visited, time spent) accessed by non-emergent ED patients with acute illness symptoms.

**Analysis:** Descriptive statistics were used in computing the summary measures (mean, median, standard deviation, and range) for the variables measured on interval or ratio scales (e.g. time spent) and frequency distributions (absolute frequency and percent) for the variables measured on nominal or ordinal scales (e.g., type of sites visited).

**Specific Aim 2:** Identify the extent to which individual characteristics (e.g. demographics) and need state (e.g. acute symptom characteristics) influenced Internet health information gathering in non-emergent ED patients.

**Analysis:** Logistic regressions were used to evaluate the potential impact of individual (demographics) characteristics and need state (acute symptom characteristics) on Internet health information gathering in non-emergent ED patients. Crude (unadjusted) regression coefficients were estimated as well as adjusted regression coefficients based on multivariate modeling of multiple factors. Residual analysis was conducted to identify sources of model misspecification, outliers, and possibly influential observations. In determining the influence of demographic and symptom characteristics on Internet health information gathering, stepwise regression analysis was used to obtain the optimal model. The level of measurement of the variables was taken into account. A hierarchical model also determined the effects of the predictor variables, either alone or in blocks.

**Specific Aim 3** Identify the extent to which Internet health information gathering influences seeking medical services (e.g. decision to go to ED).

**Analysis:** To address Aim 3, logistic regression analysis was used to explore the extent to which Internet health information gathering influences seeking medical services. Modeling began by including in the model all predictor variables (demographic and symptom characteristics, and information gathering) that either had at least a marginal bivariate association with the outcome variable of seeking medical services, which was operationalized with five questions on the survey tool, or for which there was some rationale that the variable may be a confounder or effect modifier for other variables. To obtain an optimal model, the non-significant predictor variables were deleted in a stepwise fashion. The point and interval estimates of the odd ratios of the categorical predictor variables were reported.

**Human Subjects Protection**

The Human Investigation Committee's Training was completed by the researcher and the two research assistants prior to the initiation of the data collection portion of the study. Institutional Review Board (IRB) approval was obtained from Wayne State University and the participating healthcare facility, Botsford Hospital, a Level II ED in Farmington Hills, MI. The Human Investigation Committee's Training was completed by the researcher and the two research assistants. Once IRB approvals were obtained, data collection began. An information letter describing the study and informed consent form was provided to all participants, ensuring voluntary participation, confidentiality, acknowledgement of possible risks to subjects, and ability to withdraw participation at any time. All HIPPA regulations were followed. Data was collected anonymously and stored in a locked file box by the researcher.

## Risks to the Subjects

## Human Subjects Involvement and Characteristics

The underlying scientific study involved interactions with human subjects living in or surrounding the Metropolitan Detroit area, primarily residents of Wayne and Oakland County. Risks to human subjects were minimal. The detailed inclusion criteria and recruitment strategies were developed by the principal investigator to minimize risk. The study sample included those patients presenting to an ED with non-life threatening acute symptom or symptoms, who prior to seeking ED care, looked up their symptom(s) online. Inclusion criteria included (1) All ambulatory patients between the ages of 18-80, regardless of complaint; (2) Patients who were triaged as urgent or non-urgent; (3) Patients who were in no acute distress related to airway, breathing, or circulation; (4) Patients with a self-reported level of pain of less than 5 on a 0-10 scale; (5) Ability to read and speak English, with no cognitive or neurological impairment or under the influence of drugs or alcohol; (6) Patients who were physically and mentally capable of completing a survey independently or with assistance of the researcher or research assistants; and (7) Patients who were willing to voluntarily participate. A target sample of 300 subjects was planned, 74 participated. Data collection occurred in the ED waiting area or treatment area. Research staff consented and enrolled subjects, and collected participant data.

## Sources of Material

Internet health information gathering, demographic and symptom characteristic data, and information about Internet information sources from participants was collected through an investigator developed survey questionnaire. Participant data collection occurred at the time of enrollment. Questionnaires were completed in the ED waiting area or treatment area. These data were collected only for these research purposes. Coded ID numbers were used on all study instruments. Only the PI and Research Assistants had access to surveys and surveys contained no subject identifiers.

## Potential Risks

Potential risk associated with participation in this study may have included the following:

- Participation in this study may have increased a participant's or accompanying family member's awareness of credible health information sites and appropriateness of ED utilization, which may have caused anxiety. Basic education, counseling, and emotional support to relieve anxiety were available from the PI. Based on the type of data being collected, it was anticipated that risk for serious psychological distress from participation in this research was minimal.
- As survey data was collected in the ED waiting or treatment area, efforts were taken to ensure as much privacy as possible while the survey was being taken. However, as the information that was collected surrounding Internet use was deemed not to be sensitive, risks to privacy and confidentiality were also minimal.

## Adequacy of Protections Against Risks

### Recruitment and Informed Consent

The recruitment of eligible participants took place in the ED waiting area and treatment area. Information about the study was disseminated using informal strategies (e.g., word of mouth, flyers posted in prominent areas in the ED waiting room, treatment areas and registration areas) and through formal communication media within the facility (e.g., hospital website) using materials that have been approved by the IRB. Those persons agreeing to receive further information were contacted directly by the PI or research assistants (RAs), provided with additional information, and invited to participate. The consents were completed by a member of the research team (PI or RA's) at the facility to obtain the signatures. Once consents were obtained, participants were screened to determine eligibility for the study.

### Protection Against Risk

Several strategies to protect human subjects were planned. In the event of any perceived psychological or emotional distress by the participants related to an increased awareness of the use of websites or ED utilization, basic education and counseling about credible health websites, such as .gov or .edu were provided. Coded ID numbers were used on the survey questionnaires and participant data collection instruments. The code key linking names and ID numbers were kept separately from other data. All paper records will be maintained in locked files in a locked research office within the university. In addition, published reports of results will not include subject identifiers. Subjects were advised that they could voluntarily withdraw their participation from the study analysis at any time without penalty or effect to their treatment or care while in the ED.

## Potential Benefits of the Proposed Research to the Subjects and Others

While there was no direct benefit for participants in this research initially, the findings may lead to improved planning of health resources for those seeking online health information and ED utilization. Study results may also lead to the development of improved or targeted interventions that can be directly applied to those seeking online health information or ED services in the future.

## Importance of the Knowledge to be Gained

Online health information seeking has been linked to health service utilization. Important information can be gained in terms of appropriateness of online health information sources, including websites used, as well as selection of level of health services and whether or not the service level is appropriate. ED visits are costly and more appropriate health care settings to receive services may be available or more applicable. The current gap in knowledge severely hampers the ability of care providers to assess risk and effectively intervene. Therefore, a *critical need* exists to establish recommendations for patients and practitioners caring for ED patients who seek care based on online health information as a foundation for tailored interventions.

The *long term* research goal is to fully test all components of the newly developed Health Information Seeking and ED Utilization model, including factors such as decision making processes, patient outcomes, such as satisfaction with ED services and level of service received, i.e. whether services received are congruent with patient expectation.

The *objective* in this research was to first describe whether ED patients use the Internet when faced with an acute symptom and whether the information found leads them to seek care in an ED. This is an important first step as the *rational*e is that, once known, tailored educational and behavioral interventions could be developed to assist in appropriate use of health services.

# CHAPTER 4 RESULTS

This chapter presents the results of the data analyses that were used to describe the study sample and address the study specific aims. This chapter begins with a description of the sample characteristics, followed by the univariate analyses that were conducted in preparation for the logistic regression analyses related to the study specific aims.

The purpose of this study was to examine the online health information-seeking practices of Emergency Department (ED) patients when experiencing acute, non-urgent illness symptoms. The specific aims of this study were to:

1. Determine the characteristics of Internet health information gathering (e.g. type of sites visited, time spent) accessed by non-emergent ED patients with acute illness symptoms.
2. Identify the extent to which individual characteristics (e.g. demographics) and need state (e.g. acute symptom characteristics) influenced Internet health information gathering in non-emergent ED patients.
3. Identify the extent to which Internet health information gathering influenced seeking medical services (e.g. decision to go to ED).

## Description of the Sample

Seventy-four ED patients (n=74) who utilized the internet for health information prior to presenting to the ED were recruited from the Beaumont Farmington Hills (formerly Botsford Hospital) Emergency Department. Logistic regression estimated a sample size of 242 participants would be needed to achieve 80% power at a 0.05 significance level to detect an odds ratio of 1.5. However, a sample size of 74 participants (30.8%) was actually obtained due to challenges with accessing and recruiting participants. The most common reason for refusal was ‘did not feel well”.

## Demographic Data

Individual Characteristic (Demographics) of the sample included participant’s responses to questions about age, gender, ethnic background, educational level, annual income, primary care provider and health insurance. The subjects ranged from 17-74 years old with a mean age of 42.89 (SD= 15.10). Although 18 was the minimum age for inclusion in the study, a survey was completed by the parent of child for whom care was being sought. Thus, the age of the patient was reported. Nearly 60% of those who participated were female. Forty-four (44) participants were female (59.5%) and 30 were male (40.5%). Gender of participants is depicted in Figure 3. Thirty-nine (39) of the participants were African American (52.7%), 32 Caucasian (43.2%), one Hispanic (1.4%), one Other (1.4%), and one of the participants did not report race/ethnicity. Nine of the participants completed some high school (12.2%) seven completed General Education Degrees (GED’s) (9.5%). 11 held High School diplomas (14.9%), 21 reported some college (28.4%), 12 completed undergraduate degrees (16.2%), eight had some graduate school (10.8), and 10 completed graduate school (13.5%). Thirty-three (33) participants reported income less than $30,000 annually (47.1%). Twelve had income in the $30,000-$49,999 range (17.1%); 18 reported incomes of $50, 000-$74,999 (24.3%), and seven (9.5%) reported income over $75,000 annually. Four respondents (5.4%) did not answer the question in regards to annual income. Nineteen (26.4%) of participants reported that they did not have a primary care doctor. Fifty-three (73.6%) of participants answered affirmatively in regards to having a primary care doctor. Of the 74 participants, 64 participants reported having health insurance

86.5%). Four reported they did not have health insurance (5.4%). Six participants did not answer the question (8.1%). Ethnicity was largely African American and Caucasian. Ethnicity of participants is depicted in in Figure 4. The highest percentage of participants had some college. Some participants reported in multiple areas such as finishing high and some college, therefore, education numbers total are greater than the sample size of 74. Three quarters of the participants reported having a primary care physician and health insurance. Nearly half of the participants reported income of less than $30,000 annually. Frequencies and percentages are presented in Table 1.

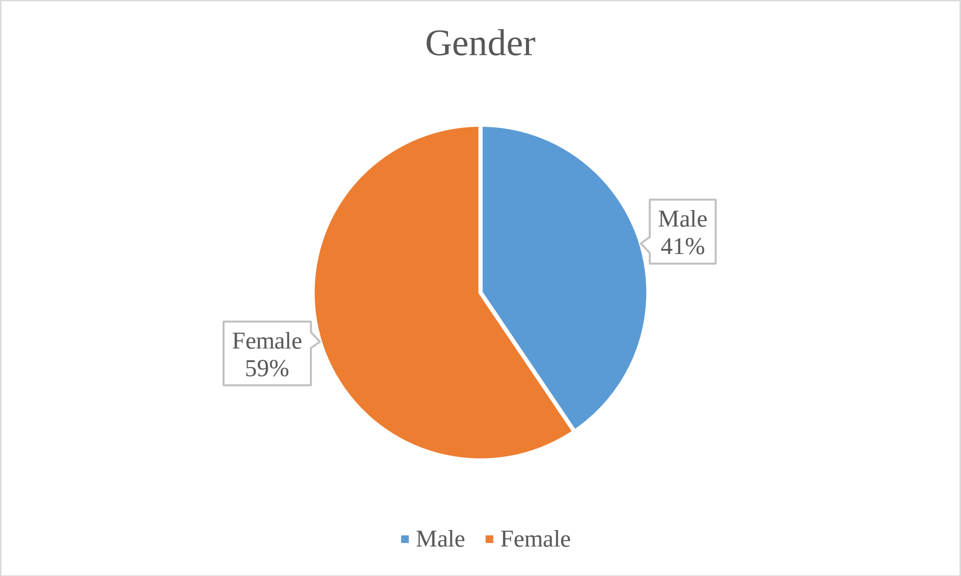


Figure 3. Gender of Participants

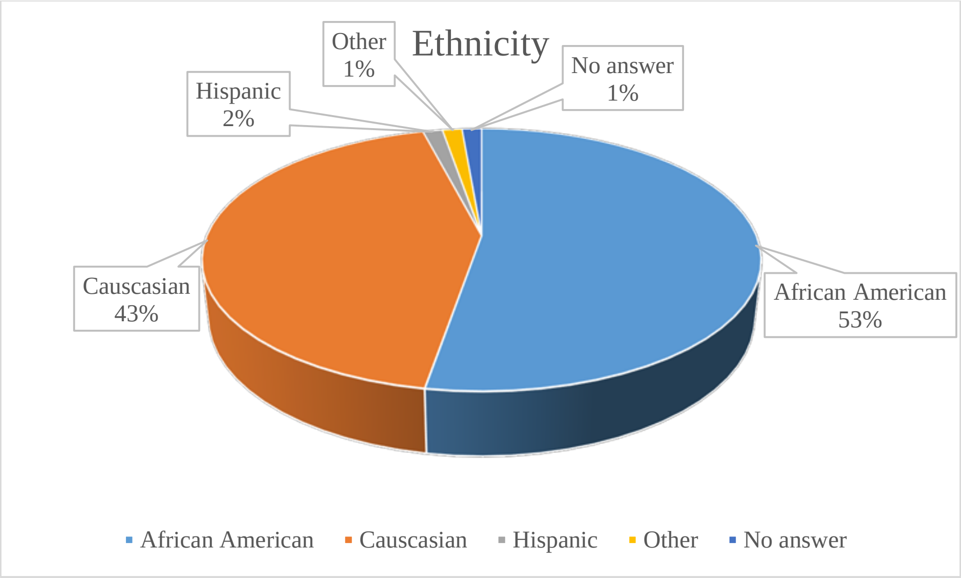


Figure 4. Ethnicity of Participants

**Table 1. Demographic Characteristics (n = 74)**

| **Variable** | **Mean** | **St. Deviation** |
|---|---|---|
| **Age in years (17– 74)** | **42.89** | **15.10** |
| **Variables** | **Frequency** | **Percent** |
| **Education** | | |
| Male | 30 | 40.5 |
| Female | 44 | 59.5 |
| **Ethnicity** | | |
| African American | 39 | 52.7 |
| Caucasian | 32 | 43.2 |
| Hispanic | 1 | 1.4 |
| Other | 1 | 1.4 |
| No Response | 1 | 1.4 |
| **Education** | | |
| Some High School | 9 | 12.2 |
| GED | 7 | 9.5 |
| High School Diploma | 11 | 14.9 |
| Some College | 21 | 28.4 |
| Undergrad Degree | 12 | 16.2 |
| Some Grad School | 4 | 5.4 |
| Completed Grad School | 10 | 13.5 |
| **Income** | | |
| Less than 30,000 | 33 | 44.6 |
| 30,000 - 49999 | 12 | 16.2 |
| 50000 - 74999 | 18 | 24.3 |
| 75000 and more | 7 | 9.5 |
| No Response | 4 | 5.4 |
| **Primary Care** | | |
| Yes | 53 | 71.6 |
| No | 19 | 25.7 |

| | | |
|---|---|---|
| No Response | 2 | 2.7 |
| **Health Insurance** | | |
| Yes | 64 | 86.5 |
| No | 4 | 5.4 |
| No Response | 6 | 8.1 |

## Description of the Need State of the Sample

In this study, one question of the survey addressed Need State (operationalized by acute symptom characteristics). The participants were asked to indicate the reason they were seeking care in the ED. Participants were permitted to provide multiple responses if they were experiencing more than one symptom. The list of options the participants could select was chosen based on the top reasons for seeking care in an ED. These options included abdominal pain, allergic reaction, bleeding, chest pain, cough, dizziness, fever, headache, nausea/vomiting, rash, sore throat or other. Reasons for seeking care are depicted in Figure 5. Of the participants, 20 reported seeking ED services for abdominal pain (27.0%), four for allergic reaction (5.4%), eight for bleeding (10.8%), 12 for back pain (16.2%), 17 for chest pain (23%), eight for cough (10.8%), eight for dizziness (10.8%), eight for fever (10.8%), 15 for headache (20.3%), 15 for nausea and vomiting (20.3%), six for sore throat (8.1%). Thirty-two participants (43.2%) reported "Other" as their reason for seeking ED services. Some respondents included multiple complaints, hence the variation in number from the total sample size. Other reasons for seeking ED services included night sweats, leg pain, leg swelling, neck pain, urinary symptoms, earache, ear infection, and physician referred. No participants reported rash as a reason for seeking ED care. Aside from the 'Other' category, which included a variety of miscellaneous symptoms not listed on the survey, abdominal pain and chest pain were cited the main reason patients came to the ED.  Many of the reported survey participants who reported these pains also complained of nausea & vomiting and headache. Frequencies and percentages are presented in Figure 5 and Table 2.

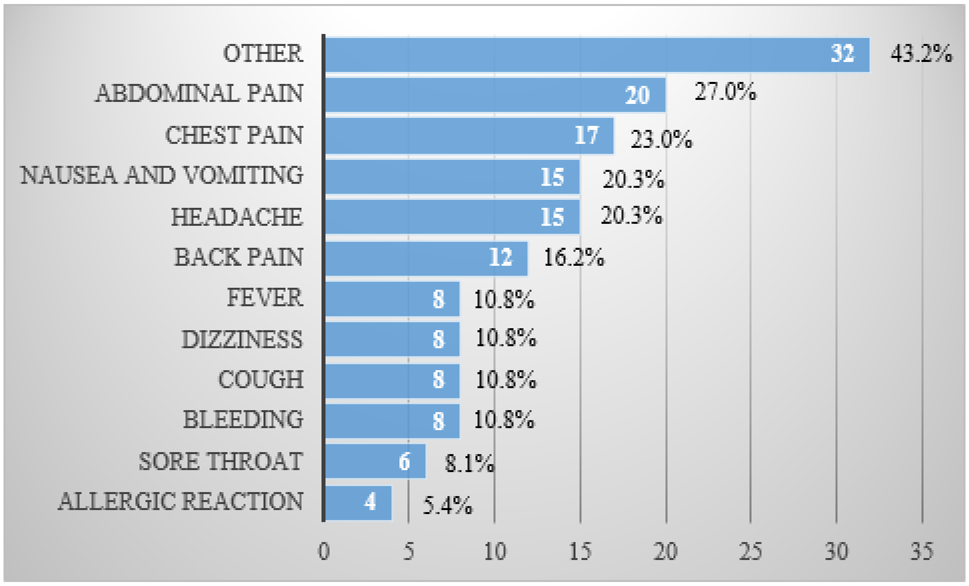


Figure 5. Reasons for Seeking ED Care

**Table 2. Frequency and Percent of Acute Symptom characteristics (n = 74)**

| Variables | Frequency | Percent |
|---|---|---|
| **Abdominal Pain** | | |
| No | 54 | 73.0 |
| Yes | 20 | 27.0 |
| **Allergic Reaction** | | |
| No | 70 | 94.6 |
| Yes | 4 | 5.4 |
| **Bleeding** | | |
| No | 66 | 89.2 |
| Yes | 8 | 10.8 |
| **Back Pain** | | |
| No | 62 | 83.8 |
| Yes | 12 | 16.2 |
| **Chest Pain** | | |
| No | 57 | 77.0 |
| Yes | 17 | 23.0 |
| **Cough** | | |
| No | 66 | 89.2 |
| Yes | 8 | 10.8 |
| **Dizziness** | | |
| No | 66 | 89.2 |
| Yes | 8 | 10.8 |
| **Fever** | | |
| No | 66 | 89.2 |
| Yes | 8 | 10.8 |

| | | |
|---|---|---|
| **Headache** | | |
| No | 59 | 79.7 |
| Yes | 15 | 20.3 |
| **Nausea & Vomiting** | | |
| No | 59 | 79.7 |
| Yes | 15 | 20.3 |
| **Rash** | | |
| No | 74 | 100.0 |
| Yes | 0 | 0.0 |
| **Sore Throat** | | |
| No | 68 | 91.9 |
| Yes | 6 | 8.1 |
| **Other** | | |
| No | 42 | 56.8 |
| Yes | 32 | 43.2 |

### Symptom Characteristics of the Sample

Nine questions on the survey addressed Symptom Characteristics. These questions included length of time the symptom(s) had been experienced by the participant, how severe did the participant perceive their symptom(s) and how soon after the problem began did they begin to look for health information on the Internet. Other questions included whether the Internet was used for general health information, whether the information search began with a search engine, length of time spent looking for information, any websites visited and whether the participant talked with anyone about the information found.

*Length of Time Experiencing Symptoms*: Participants were asked to respond to a question regarding how long in time they were experiencing the symptoms that led them to seek care in the ED. Three of the respondents were experiencing their symptom for less than one hour (4.1%); Four participants reports they were experiencing symptoms for one to three hours (5.4%); Seven participants (9.5%) had been experiencing their symptoms three to six hours. Four participants reported they symptoms are lasting six to twelve hours (5.4%); Five participants reported their symptoms for 12-24 hours (6.8%); Five participants indicated symptoms for one day (6.8%). Eighteen participants had their symptoms for one to three days (24.3%). Ten participants reported their symptoms for three to seven days (13.5%). Seventeen participants (23%) reported their symptoms for longer than one week. One participant did not answer the question. There was wide variability in the length of time symptoms were experienced, the majority of participants (60%) reported they had been experiencing symptoms for greater than one day before seeking care in the ED. Length of time participants reported experiencing symptoms is depicted in Figure 6.

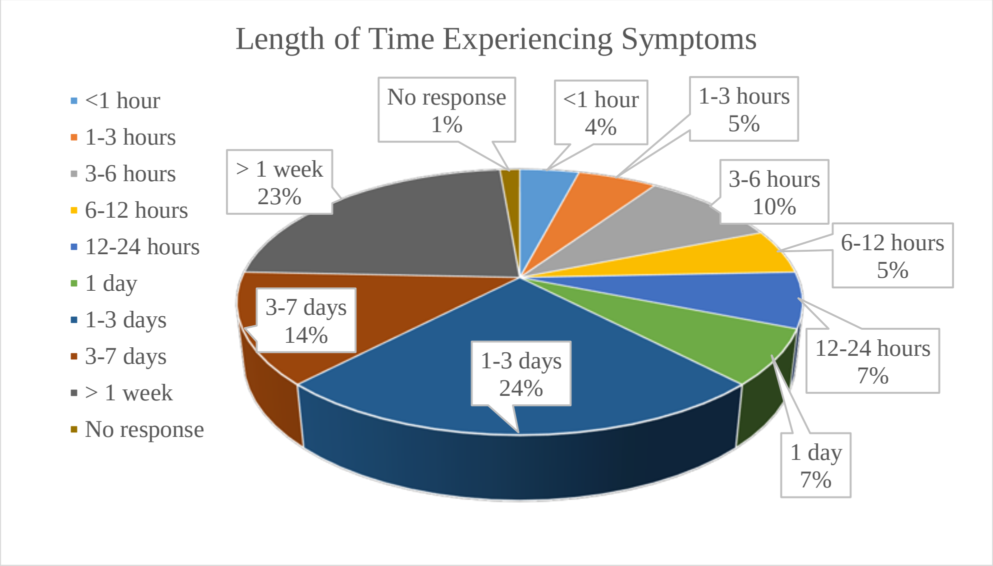


Figure 6. Length of Time Experiencing Symptoms

***Perceived Severity:*** Participants were asked to respond to a question related to their perception of severity of the symptoms they were experiencing on a "1-5 "scale with one (1) indicating least severe through five (5) as most severe. More than half of the participants (66.2%) of participants perceived their symptom at the highest severity levels.

**Table 3. Frequency and Percent of Time Experiencing Symptoms (Duration) of Patient Perception of Symptom Severity (n = 74)**

| Variables | Frequency | Percent |
|---|---|---|

| | | |
|---|---|---|
| **Experiencing Symptoms Duration** | | |
| Less than one Hour | 3 | 4.1 |
| 1-3 hours | 4 | 5.4 |
| 3-6 hours | 7 | 9.5 |
| 6-12 hours | 4 | 5.4 |
| 12-24 hours | 5 | 6.8 |
| One day | 5 | 6.8 |
| 1 -3 days | 18 | 24.3 |
| 3-7 days | 10 | 13.5 |
| more than one week | 17 | 23.0 |
| No Response | 1 | 1.4 |
| **Perception of Severity** | | |
| 1 Least Severe | 5 | 6.8 |
| 2 | 5 | 6.8 |
| 3 | 15 | 20.3 |
| 4 | 23 | 31.1 |
| 5 Most Severe | 26 | 35.1 |

### Study Specific Aims and Research Questions

Three specific aims and associated research questions were developed for this study. The results of the statistical analyses used to address study aims are presented in this section. All decisions on statistical significance of the inferential statistical analyses were made using a criterion alpha level of .05.

### Specific Aim #1: Determine the characteristics of Internet health information gathering by non-emergent ED patients with acute illness symptoms.

***Time of Information Seeking after Symptom Onset:*** Participants were also asked how soon after their symptoms began they began to look on the Internet for information. Fifteen reported within one hour after symptoms began (20.3%). Sixteen participants reported one to three hours (21.6%). Five participants began to look for information in three to six hours (6.8%). Six participants began to search for information in six to eight hours (8.1%). Another six participants began to search for information in 12-24 hours (8.1%) and 23 participants began to look for information more than 24 hours after they began experiencing their symptoms (31.1%). Three participants did not respond to the question. Time of Information Seeking After Symptom Onset is depicted in Figure 7.

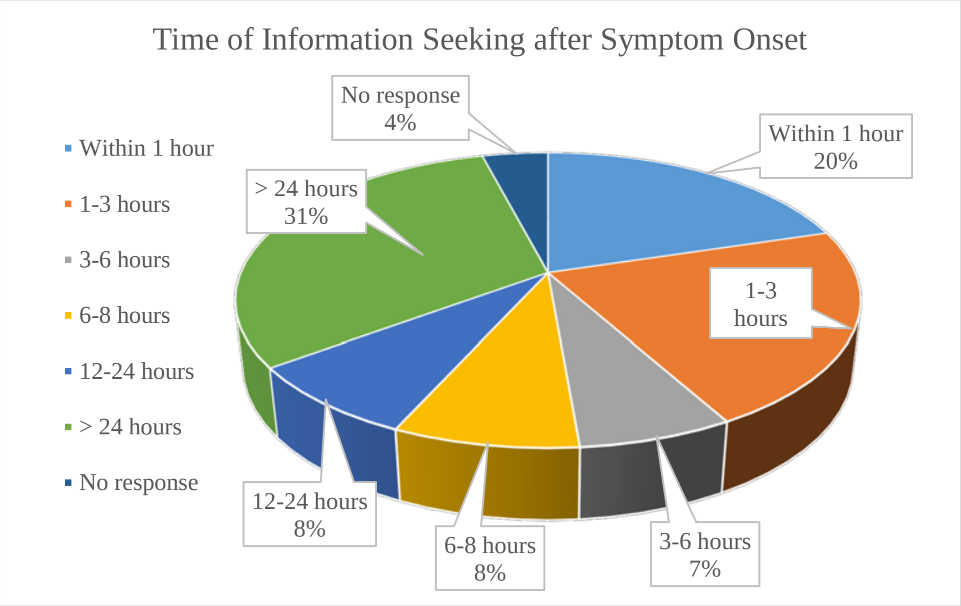


Figure 7. Time of Information Seeking After Symptom Onset

***Urgency of Problem*****:** Participants were asked if they considered their problem to be emergent, urgent or non-urgent. Over half of the participants (62.8%) indicated their problem was urgent and 35.1% felt their problem was emergent. Only 4.1 indicated they felt their problem was non-urgent. Participant's perception of problem urgency is depicted in Figure 8.

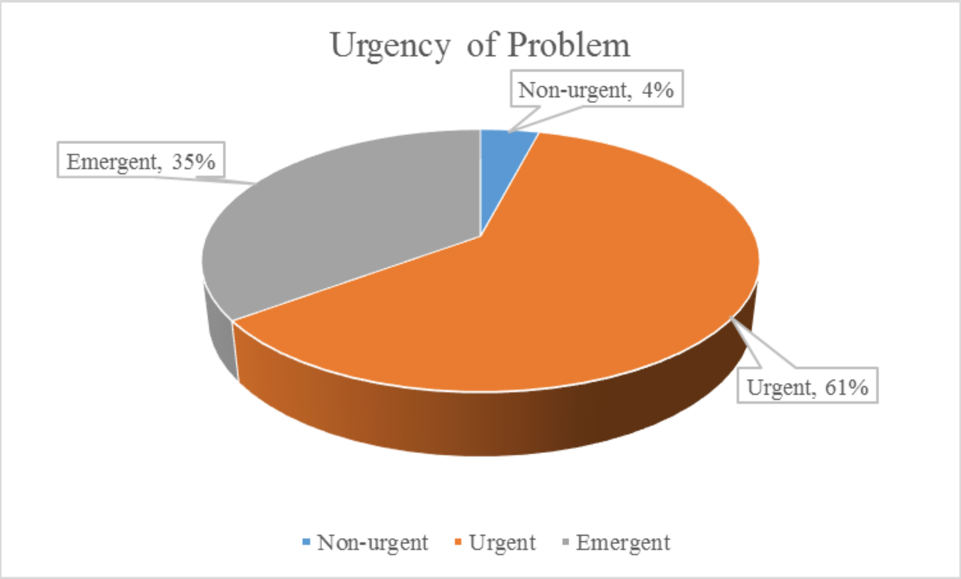


Figure 8. Participants Perception of Problem Urgency

*Use of Internet for General Health Information:* Participants were asked whether they use the Internet for general health information. Eighteen (24.3%) responded “No” and 54 participants responded “Yes (73%). Two participants did not answer the question.

*Begin with Search Engine:* Eighteen participants (24.3%) did not begin their Internet health information search with a search engine. Fifty-five (74.3%) began with a search engine. One participant did not respond to the question.

*Time spent looking for Health Information:* Nearly 42% of participants spent less than one but not more than three hours looking for health information. Thirty-one percent (31%) spent more than 24 hours.

**Table 4. Frequency and Percent of Time Spent Seeking Information on the Web (n = 74)**

| Variables | Frequency | Percent |
|---|---|---|
| **Time Spent Looking for Information** | | |
| Within one hour | 15 | 20.3 |
| 1 -3 hour | 16 | 21.6 |
| 3 -6 hour | 5 | 6.8 |
| 6 - 8 hour | 6 | 8.1 |
| 12 - 24 hour | 6 | 8.1 |
| More than 24 hour | 23 | 31.1 |

| | | |
|---|---|---|
| No Response | 3 | 4.1 |
| **Urgency** | | |
| Non-urgent | 3 | 4.1 |
| Urgent | 45 | 60.8 |
| Emergent | 26 | 35.1 |
| **Internet General Health** | | |
| No | 18 | 24.3 |
| Yes | 56 | 75.7 |
| **Search Engine** | | |
| No | 18 | 24.3 |
| Yes | 55 | 74.3 |
| No Response | 1 | 1.4 |
| **Websites Accessed** | | |
| Web Med | 18 | 24.3 |
| Google | 8 | 10.8 |
| Other | 11 | 14.9 |
| No Response to question | 37 | 50.0 |

*Websites Visited:* Participants were able to write in any Internet websites they remembered visiting and gathering information about their symptoms. WebMD was reported by 18 participants (24.3%). Google was listed by eight participants (10.8%). Two participants listed Yahoo (2.7%). Two participants listed Wikipedia (2.7%). Seven other websites mentioned by individual participants (1.4% each) included, ask.com, eHow, Doctors, healthline, Kids Health, and Mayo clinic. Also used in determination of Need State, participants were asked whether they talked with anyone about the information they found on the Internet prior to seeking care in the ED**.** Reponses were almost equally split. Thirty-three participants (44.6%) did not talk with anyone and 35 participants (47.3%) did talk with someone about the information found. Six participants did not respond to the question.

**Specific Aim #2: Identify the extent to which individual characteristics (e.g. demographics) and need state (e.g. acute symptom characteristics) influenced Internet health information gathering in non-emergent ED patients.**

Logistic regression was used to explore potential differences in predictor variables of age, gender, education, income, and need state, between who had accessed the web for the health information and those who had not. As shown in Table 5, only education level was significant in the logistic regression equation (OR=1.84, p = 0.012). Specifically, participants with a higher level of education were 1.84 times more likely to seek health information via the web.

**Table 5. Logistic Regression Results**

| Predictors | Estimated Coefficients | Standard Error | Chi-Square | df | p-value | Odds Ratio | 95% C.I. for Odds Ratio | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lower | Upper |
| Age | -0.03 | 0.02 | 1.70 | 1 | 0.192 | 0.97 | 0.94 | 1.01 |
| Gender | -0.33 | 0.66 | 0.25 | 1 | 0.617 | 0.72 | 0.20 | 2.61 |
| Education | 0.61 | 0.24 | 6.27 | 1 | 0.012 | 1.84 | 1.14 | 2.96 |
| Income | -0.22 | 0.35 | 0.38 | 1 | 0.536 | 0.80 | 0.40 | 1.61 |
| Need State | -0.17 | 0.20 | 0.72 | 1 | 0.397 | 0.85 | 0.57 | 1.25 |
| Constant | 0.18 | 1.59 | 0.01 | 1 | 0.910 | 1.20 | | |

### Specific Aim #3: Identify the extent to which internet health information gathering influenced seeking medical services (decision to go to the ED).

To Identify the extent to which Internet health information gathering influenced seeking medical services (e.g. decision to go to ED), the data were analyzed by multiple regression to evaluate the potential impact of age, gender, education, income, and need state on the number of ED visits. As shown in Table 6, only gender (t = – 2.44, p = 0.018) had a significant relationship with the number of ED visits at a 0.05 level of significance. In addition, income had a significant relationship with the number of ED visits at a 0.10 level of significance (t = – 1.92, p = 0.059). All five predictors explained 20% of the variance in number of ED visits (F = 3.02, p = 0.017). The number of ED visits over the past year by gender were examined. Females had an average of 2.58 visits. Males had an average of 1.31. With other variables held constant, for each unit increase of gender, there was a 1.51 unit increase in number of ED visits by females than males. In addition, number of visits decreased by 0.61 for every unit increase in income.

**Table 6. Regression Analysis Predicting Number of ED Visits**

| Variable | B | SE B | Beta | t | *p* value |
|---|---|---|---|---|---|
| Age | 0.02 | 0.02 | 0.13 | 1.03 | 0.307 |
| Gender | – 1.51 | 0.62 | – 0.31 | – 2.44 | 0.018 |
| Education | – 0.07 | 0.19 | – 0.05 | – 0.37 | 0.709 |
| Income | – 0.61 | 033 | – 0.27 | –1.92 | 0.059 |
| Need State | 0.21 | 0.19 | 0.14 | 1.15 | 0.257 |

$R^2$ = 0.20, F = 3.02, p = 0.017)

Note: B: Unstandardized Regression Coefficient
SEB: Standard Error
Beta: Standardized Regression Coefficient

**Seeking Medical Services of the Sample**: Five of the survey questions related to Seeking Medical Services. Participants were asked to respond to whether they tried to treat their problem at home prior to seeking care in the ED, were asked whether they considered seeking care in another location besides the ED, about their overall ED usage over the past 12 months, whether they used the information they found on the Internet to determine whether they should seek care in the ED and whether the information found influenced their decision to come to the ED.

*Treat yourself*: Nineteen participants (25.7%) did not try to treat themselves at home. Fifty-five (74.3%) did try to treat first at home prior to coming to the ED.

*Other Locations of Care*: Forty-three participants (58.1%) did not consider any other location besides the ED for care for their problem. Twenty-nine participants (39.2%) reported they considered another location. Two participants did not respond.

*Number of ED visits within the past 12 months not counting current*: Sixty-nine of the 74 study participants responded to the question regarding ED utilization in the past 12 months. Twenty-one participants (28.6%) had no previous ED visits in the past 12 months. Sixteen participants (21.6%) had one prior visit; nine (12.2%) had 2 prior visits; 10 participants (13.5%) had 3 prior visits; four participants had 4 visits (5.4%); three participants had 5 visits (4.1%), four participants had 6 visits (5.4%). One participant reported 10 visits (1.4%) and one participant reported 12 visits (1.4%).

*Use of health information found on the Internet to determine whether they should seek ED care:* Participants were asked whether they used the health information they found on the Internet to determine whether they should come to the ED. Forty-four (59.5%) responded they did not they use the health information they found on the Internet to determine whether they should come to the ED. Twenty-eight participants (37.8%) responded they did use the information found on the Internet to determine whether they should come to the ED.

*Internet Information Influence Decision:* When asked whether information found on the Internet influenced the participant's decision to come to the ED, thirty nice participants (52.7%) responded that information found on the Internet did not influence their decision. Thirty-two (43.2%) participants responded affirmatively—that information found on the Internet influenced their decision to come to the ED.

**Table 7. Frequency and Percent of Seeking Medical Services (n = 74)**

| Variables | Frequency | Percent |
|---|---|---|
| **Talk** | | |
| No | 33 | 44.6 |
| Yes | 35 | 47.3 |
| No Response | 6 | 8.1 |
| **Treat First at Home** | | |
| No | 19 | 25.7 |
| Yes | 55 | 74.3 |
| **Any Other Location** | | |
| No | 43 | 58.1 |
| Yes | 29 | 39.2 |
| No Response | 2 | 2.7 |

| | | |
|---|---|---|
| **Info determined** | | |
| No | 44 | 59.5 |
| Yes | 28 | 37.8 |
| No Response | 2 | 2.7 |
| **Info influenced ED visit** Web Med | | |
| No | 39 | 52.7 |
| Yes | 32 | 43.2 |
| No Response | 3 | 4.1 |

## Summary

Findings from this study are consistent with previous studies in terms of demographics of Internet health information seeking. Gender was the only statistically significant relationship with the number of ED visits at a 0.05 level of significance and income had a significant relationship with the number of ED visits. There was a 1.51 unit increase in number of ED visits by females than males. In addition, number of visits decreased by 0.61 for every unit increase in income.

# CHAPTER 5 DISCUSSION

This chapter presents a discussion of the study results. In the first section, findings relevant to study specific aims are discussed within the context of extant research literature and the newly developed model. Discussion of each specific aim is followed by general discussion pertaining to the overall study findings. Limitations of the study, implications for theory development, nursing research and nursing practice, as well as future research directions are also addressed.

The purpose of this study was to examine the online health information-seeking practices of Emergency Department (ED) patients when experiencing acute, non-urgent illness symptoms. The specific aims of this study were to:

1. Determine the characteristics of Internet health information gathering (e.g. type of sites visited, time spent) accessed by non-emergent ED patients with acute illness symptoms.
2. Identify the extent to which individual characteristics (e.g. demographics) and need state (e.g. acute symptom characteristics) influenced Internet health information gathering in non-emergent ED patients.
3. Identify the extent to which Internet health information gathering influenced seeking medical services (e.g. decision to go to ED).

## Discussion Aim #1

### Determine the characteristics of Internet health information gathering (e.g. type of sites visited, time spent) accessed by non-emergent ED patients with acute illness symptoms.

The results of this study suggest that persons of all demographics including age, gender, ethnicity, educational level, income, those with and without insurance, and those with or without a primary health care provider are using the Internet to obtain health information. These findings are consistent with the Pew Report dating back to the first report in the year 2000 regarding demographics of Internet use for health information and in regards to the type of websites visited for health information, such a Google or WebMD (Pew, 2000; Pew 2012). Emerging from this study and what still remains unknown and warrants further investigation is the amount of time being spent seeking and gathering health information.

Seventy-four ED patients (n=74) who utilized the Internet for health information and sought ED health services for acute, non-urgent illness symptoms were surveyed. Findings from this study indicate that 74.3% of participants began their health information search with a search engine such as Google, and a majority who responded (24.3%) reported utilizing Web MD for their health information These findings are consistent with the hallmark Pew Internet Report (2012) which reported that 77% of those who search for health information online begin with a search engine such as Google or Bing. In this study, 75.7 % indicate they are general health Internet users, pointing to the fact that these users would be more likely to utilize the Internet when a symptom presents or in response to a specific health need.

Another finding according to the Pew Report of Internet users, 13% say they began to search for information at a site that specializes in health information, such as WebMD (2012). Although sample size was limited, approximately one-quarter (24.3%) of participants in this study reported utilizing Web MD for their health information. WebMD, founded in 1996, provides information on health topics including symptom checklist, pharmaceutical and drug information, physician blogs on health topics, and a portal in which to house personal health information. Consumers should be aware that WebMD also offers advertising which is linked to pharmaceutical corporations. This may influence views about symptoms that are linked to drug therapy offered by advertisers. WebMD also owns and operates a similar site, MedicineNet. MedicineNet, also provides detailed information about diseases, conditions, medications and general health. While it may not be necessary that consumers be advised against the use of WebMD or Medicine.Net, they should recognize that content is for informational purposes only and they should not base health and health seeking decisions solely on information found on these sites. WebMD should be used cautiously, or in conjunction with, other sites that provide health information. Comparisons should then be made about recommendations regarding specific symptoms. Findings that are consistent on multiple sites could then be used to better inform health seeking decision making and health service utilization decisions.

Because of the abundance of information available on the Internet, health information seeking for specific symptoms can be a challenge. It is imperative that consumers retain a level of skepticism regarding information found and to be aware of Internet sites that are sponsored by profit-making entities. Consumers need to be wary of websites that advertise or sell products or services, often the .com or commercial websites.

Nurses and health care providers who are educating their patients regarding creditable websites should recommend those Internet sites that are linked to .gov or .edu organizations. There are also a number of high quality sites like the National Library of Medicine's MEDLINEplus, Centers for Disease Control and Prevention, Healthfinder, Kidshealth, MayoClinic. These sites are also named by the Medical Library Association as the most useful consumer health websites (http://www.mlanet.org/p/cm/ld/fid=397).

Finding reliable health information online can be daunting for even the most educated. The challenge then for health care providers who wish to educate consumers is to direct them to websites that are linked to .gov for government, .edu for educational institutions and .org for non-profit health associations. Credible sites will have easy to access information about who runs the site and how to content. Consumers should also be informed about giving personal information in order to protect privacy. Consumers should also visit more than one site and compare information found. If the same information is appearing on multiple sites, the information is more likely to be accurate. Consumers also be educated to look for the HON Code. This code is to certify health related-websites that quality health information is being provided (http://www.hon.ch/HONcode/Conduct.html)

Further investigation is needed on how consumers are deciding which sites to use. In addition, future studies should also look to investigate how consumers are deciding whether the information they are finding is credible. Health literacy, the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions (U.S. Department of Health and Human Services. 2000. *Healthy People 2010)* plays a pivotal role in understanding health information seeking

Another noteworthy finding in this study regarding the characteristics of internet health information gathering is the varied amount of time spent seeking and gathering health information. Of the 51 participants who reported the amount of time they spent searching for health information, the times varied considerably and ranged from two minutes to five hours. No studies found addressed time spent seeking health information on the Internet. Further investigation into the amount of time spent searching for information, may yield new insight to this body of knowledge surrounding internet health information seeking and health service utilization, as research surrounding the time spent seeking for information appears to be a gap. What remains unknown is whether consumers of Internet health information are basing health and treatment seeking decisions or a medical diagnosis based on a quick symptom search. Adequate time should be spent researching credible sites. Future studies could investigate the average amount of time people are spending gathering information as well as to investigate whether there is a minimum amount of time that needs to be spent based on the user demographics and types of sites visited.

## Discussion Aim #2

**Identify the extent to which individual characteristics (e.g. demographics) and need state (e.g. acute symptom characteristics) influenced Internet health information gathering in non-emergent ED patients.**

Women and those with higher education level are more likely to utilize the Internet for health information emerged as significant demographics in this study. Abdominal pain (27%), chest pain (23%), headache (20.3%) and nausea and vomiting (20.3%) emerged as high frequency symptoms amongst the participants in this study. Findings from this study vary slightly with what is known regarding demographics of Internet users, however, due to the small sample size cannot be generalized. A finding of significance was in this study, in terms of gender and education, women and those with higher education level are more likely to utilize the Internet for health information.

The mean age in this study was 42.89. According to the 2011 Pew Report, 93% of Internet users are in the 30-49 age range. In regards to gender, in the Pew Report (2011) 87% of Internet health information seekers are male and 86% female. In regards to Ethnicity, Pew (2011) findings report Internet health information seekers are 85% Caucasian and 81% African American. Of the 74 participants in this study, 52% were African American and 43% Caucasian. In terms of education of the study participants, 76% had a high school education or less; 91% of participants had some college, and 97% were college graduates. When compared with the Pew Report of income (2011), 75% report less than a $30,000 annual income. In this study, a lesser number, only 44.6% of participants reported an income in that range. Almost a quarter (24.3%) of participants in this study reported a significantly higher income of $50,000-$74,999 annually.

*Primary Care Doctor and Health Insurance*: In this study, 53 participants (71.6%) reported having a primary care doctor. Nineteen participants (25.7%) reported they did not have a primary care doctor. Two participants did not answer the question. Sixty-four participants (86.5%) reported having health insurance. Only four participants (5.4%) reported they did not have health insurance. Six did not respond to the question. These findings are consistent with the American College of Emergency Physicians (ACEP) of most frequent users of the emergency department have a regular source of medical care and health insurance http://newsroom.acep.org/fact_sheets?item=30011. This study adds to the current body of knowledge in terms of those of all demographics or 87% of adults utilize the Internet for health information. Education on use of the Internet should then be tailored to include those with lower education levels. Efforts need to be made to meet the needs of those individuals, perhaps starting with heath literacy and readability of posted health care content. Although the majority of the findings in this study were not statistically significant, there were several findings of note. The research questions focused on several areas of the newly developed model. These included demographic characteristics that were operationalized through responses to the following questions: age, gender, ethnicity, and education level, income level, having a primary health care provider and having health insurance. Although not statistically significant, but a finding of note was that those that answered affirmatively in having a primary care provider were more likely to seek ED care. This could be based on the type of symptom; the time of day the symptom was being experienced or the availability of appointment times of the provider. If the symptoms experienced are perceived as severe, this may address why even those with a primary care provider still seek care in an ED but warrant further investigation.

This study also provided information about what type of acute symptoms were being sought based on a list of main reasons for seeking care in an ED. Abdominal pain (27%), chest pain (23%), headache (20.3%) and nausea and vomiting (20.3%) emerged as high frequency symptoms amongst the participants in this study. These are consistent with the AHRQ Overview of Emergency Department Visits in the United States (2011). Although the list of options included on the survey in this study was not exhaustive and did not capture all of the reasons for participant's visits, Internet health information seekers also need to learn to better describe specific symptoms when seeking health information.

Sites often do not list all necessary symptoms so a user can make an informed decision (Frakt, 2016). Even when symptom checkers suggest a diagnosis, ranging from minor to life-threatening, often too many are suggested and patients are unable to reasonably deduce the correct diagnosis. Therefore, patients are unable to determine whether they should treat at home, call the doctor, or visit and ED. Another finding of note was that nearly 98% (97.9%) who participated reported their perceived symptom severity as emergent or urgent. No studies to date found addressed the phenomenon of perceived symptom severity in terms of health information seeking or utilization of health services. Perceived symptom severity needs further investigation as to why symptoms experienced by participants were perceived as emergent or urgent. Future research on this topic should consider this line of inquiry. Questions about perceived severity could include the symptom itself, past experiences, level of discomfort caused by the symptom or the degree of disruption in activities of daily living. In 2008, Shaw, Brittain, Tansey & Williams conducted a qualitative study with older adults that addressed the role of symptoms and symptom severity, however only included urinary symptoms. In the future, a similar study could be conducted with adults who visited an ED that included a wide variety of symptoms to obtain more information on perceived symptom severity, another area of the new model. As this study was looking primarily at what symptoms persons were experiencing when seeking ED care and perceived severity was not a study specific aim, symptoms were not correlated with severity. However, this topic area could be used as the foundation for, or in the design of, future studies.

## Discussion Aim #3

### Identify the extent to which Internet health information gathering influenced seeking medical services (e.g. decision to go to ED).

One of the primary research questions foundational to this study was whether health information found on the Internet information influenced the decision to seek ED care. The results of this study revealed that 44 participants (59.5%) did not use the health information they found to determine whether they should come to the ED. Twenty-eight participants (37.8%) responded that they did use the information to determine whether they should come to the ED. Pourmand & Sikka (2011) had similar findings when investigating the impact of Internet health information and the decision to seek care in the ED. Their sample consisted of 489 ED patients and of those, 41.9% did not use the health information found to determine whether to come to the ED. Additionally, 52.7% (39 participants) in this study reported that information found did not influence their decision but 43% percent of participants in this study reported information found influenced the decision. In the 2009 Sullivan study, 46% indicated information found made them more likely to go to the ED.

Widespread utilization of the internet raises some questions about its impact on health behavior, health service utilization and finally on health outcomes “and no sufficient data is available to answer the above questions, in particular the relation between seeking health information on the internet and health care utilization” (Bouche & Migeot, 2008). Limited studies exist in terms of the influence of Internet health information on the decision to seek care. In the reviewed literature, four quantitative studies were found. Godman & MacPherson (2006) surveyed 950 parents of children brought an ED. Fifty-six percent (56%) of parents searched for internet health information, 8.5% right before their visit.

The results in this study compares with the finding by Sullivan (2009). Although the sample size was much larger, (n=530) 46% of participants (indicated that information found made them more likely to go. Forty-three percent (43%) of participants in this study reported information found influenced the decision. Although this study had a much smaller sample size, findings were consistent with other primarily descriptive studies (Sullivan, 2009; Pourmand and Sikka, 2011; Goldman & McPherson, 2006).

There is still much to be described about the phenomenon of health information gathering and health service utilization. A question was posed by Suziedelyte (2012) in terms of whether Internet health information was a substitute or complement. From the results of this study, health information appears to be a complement, as 59.5% reported that the information did not determine whether they should come to ED and 52.7% reported that information did not influence the ED visit.

There were several areas addressed in this study that warrant further inquiry including discussion of shared information found with others, self-treatment at home, consideration of other locations of care, and whether information found influenced the decision to seek care in the ED. Although responses were nearly equally split with those who talked with others about information found, those that did not share the information (44.6%) and those that did (47.3%), further investigation as to with whom the information was shared, what information was shared, or why information was or was not shared with others and the role that played in seeking ED services.

In this study, 74.3% participants reported they attempted to try to treat this problem at home prior to coming to the ED, perhaps indicating that the intent was to not utilize the ED. This study begins to address a limitation identified in the 2005 Budtz and Witt study that found that while many studies addressed Internet usage and quality of health related websites, no references were found concerning preparation for the visit (Budtz & Witt, 2005). More information is still needed on how information seekers arrived at what they perceived their diagnosis to be based on information found, the type of symptom that was being experienced, what types of self-treatment were being utilized, as well as what informed the decision for how to treat and for how long before professional health services were sought. These finding all warrant further investigation.

Participants in this study were asked to respond to a question as to whether they considered other locations of care. While 39.2% answered affirmatively, participants were not asked to specify what other location was considered which would have provided additional insight. The greater number, 58.1% indicated they had not considered another location besides the ED for service, perhaps pointing to the fact the ED is a preferred location of care and will still be utilized, regardless of the problem or whether sources of Internet information deem an ED visit unnecessary. More exploration of alternate locations of care are also still needed when investigating ED patients with acute non-urgent illness symptoms.

Participants were asked about their overall ED usage in the past 12 months. Lesley et al. (2015) defines frequent ED users as those with three to 10 ED visits within 12 months. However, definitions of what constitutes a frequent ED user vary.

Greater than half (52.7%) of the participants in this study indicate that information found did not influence their decision to seek care in the ED. These study results both differ and confirm from the results obtained by Sullivan in 2009 examining ED patients Internet use and the relation to ED utilization. Sullivan's findings showed that of the 21% who reported information seeking before the ED visit, 46% indicated made them more likely to go. In this study, the number was slightly less—only 43% indicated that information found influenced the ED visit. Due to findings in this area being relatively equally split, further investigation is needed to identify what is or is not influencing the health decision being made. A potential future study could provide participants with a case study scenario that includes including demographic information, including age and gender, past medical history, current symptoms and provide Internet health information sites to determine how participants would use that information, whether a decision is influenced, and what specific information influences the decision.

## Study Limitations

This study, although an important step in the combined health information gathering and ED utilization literature, was not without limitations. These limitations included utilizing a newly developed model, utilization of an investigator developed questionnaire, and limitations in data collection including sample size, potential for sampling bias, and limited statistical power.

First, this study utilized a new, untested model that combined health information seeking and health service utilization. Within the model, there were many variables and therefore, could not be used entirety. Several components of the model that addressed the specific aims of the study were chosen since it was first necessary to further investigate health information seeking and resultant ED utilization. These areas of the model included Individual Characteristics (Demographics), Need State including (symptom characteristics including symptom type, duration and perceived severity), Information gathering (use of the Internet) and ED usage. To determine the effectiveness of the entire model, there must be further studies done with individual components in order to determine whether all components are useable, or whether modifications to the model are required. Taking an alternative viewpoint, this study lays the foundation for future research utilizing this model. Although this study had a small sample, this was a preliminary step in determining the effectiveness of the selected model components. Basic research questions could be addressed with a relatively short survey and results analyzed. As the sample size was small, interpretation of the results cannot be utilized to make strong conclusions about Internet health information seeking and correlations to ED utilization. These results therefore are not confirmatory and generalizable to the larger population but can be considered a foundation when further studying the correlation between Internet health information gathering and seeking ED services.

This study also used fourth year ED residents at Botsford Hospital as Research Assistants. Although utilizing the ED residents who staffed the ED, had access to the patients, and could make judgments regarding inclusion criteria and severity status, future nursing research studies should undoubtedly involve nurses in the study design and data collection process. ED Nurses may have a greater interest in the study outcomes and may ultimately be more committed to the process. Magnet institutions that support nursing research would be considered as data collection sites. By involving the nurses in the research process from the beginning and informing the nurses of how they may utilize the study findings in their practice in terms of how they care for or educate patients, they may have a more vested interest in the research process and data collection. Efforts would need to be made to orient the staff nurses at the chosen facility, especially the triage nurses who often are the first staff members the patient encounters. The triage nurse could incorporate whether the patient utilized the internet as a preliminary screening and potentially enroll patients and administer surveys.

**Access to subjects**

This study was designed without thorough knowledge of the patient throughput processes at the facility chosen for data collection. The patient triage process at the data collection site did not allow sufficient access to potential participants as originally planned. Additionally, it was thought that completion of a short survey would not be a burden to patients and could assist in passing time while in the waiting area or waiting to be seen, but even patients who were triaged as non-urgent had a different perception of their health status and often cited “not feeling well” for a reason not to participate in the study while in the waiting or treatment area. Although this study did yield some preliminary data in terms of ED patients, Internet health information gathering and ED utilization, future methodologies could include surveying patients retrospectively after their ED visit. This would also allow further study of the model components including outcomes such as Patient Satisfaction and Symptom Reduction. Follow-up could be done by contacting those who visited the ED shortly after their visit or coordinating a retrospective chart review. Once seen in an ED and a diagnosis received, patients may have a different perspective of their problem, including severity. In this scenario, the triage nurse could be utilized in a screening process for Internet usage and follow-up could be done with those after their ED visit. This could also yield findings as to whether health information found and the anticipated diagnosis by the patient was the actual diagnosis on discharge.

Both through study design and specific aims, this study did not capture those patients who did utilize the Internet but chose not to participate as well as those who did not present to the ED after symptom search, or address whether the ED visit was appropriate. These latter categories also could provide the basis for future research in terms of those who do not choose go to the ED based on information found.

In this study, an investigator developed survey was used. The survey was designed to obtain basic descriptive information as little was known about Internet health information gathering in ED patients and ED utilization. The 22-question survey was designed to be administered quickly and pointed questions based on the study aims addressed. There was no statistical validity testing done on the survey tool, however, pilot testing confirmed content validity. Due to the small sample size, external validity could not be established. Future research could also pilot test the statistical validity of the instrument used in this study. Additionally, future studies could also utilize instruments or portions of instruments that that have been psychometrically validated, such as the HINTS questionnaire used in the study by Ziebland, et al., (2004).

Although the study contained limitations in several areas, it is important to address these limitations so they can be avoided and modifications made for future studies. The limitation related to data collection methodology yielded a significantly lower number of participants than originally planned. This affects both the reliability and generalizability of the study findings. In spite of the limitations, results from this study can be used as the basis for future research with ED patients in a number of directions and to propel the state of the science further.

## Sources of Error

Statistically significant relationships in this study may have emerged if the target sample size had been achieved. Additional sources of error may have occurred in patient responses in terms of divulging personal information affecting the demographic findings Also, those who completed surveys in the waiting area or treatment area may have felt their care would be compromised if they did not participate creating another potential source of error.

## Implications for Theory Development

This study offers another confirmation to what is already known on the topic of health information seeking. As studies in this area have been largely atheoretical, the time has come to apply theory as further concepts of the new model linking the Lenz Model of Information Seeking with Anderson and Newman Health Service Utilization model updated to include Internet search. The results of this study, like previous studies on this topic, demonstrate that internet health information is being utilized in conjunction with ED utilization. Application of a variety of theories to this topic could take researchers in various directions including, nursing, psychology, communications and informatics. Additional theories that could be used based on the model include a variety of theories from multiple disciplines. These include consumer decision making, psychology, nursing and technology. Examples include Orem’s Self-Care and Self-Care Deficit Theory (1984), the Health Belief Model, especially the construct of perceived seriousness (1974), and theories from technology including the Technology Acceptance Model (Davis, 1989), and the Lazy User Model (Collan & Tetard, 2007). The Technology Acceptance Model and Lazy User Model are both information systems models. The Lazy User Model could perhaps be applied to explain the limited amount of time spent by some when searching an acute symptom on the Internet as in this model, the user is supposed to select the solution that requires the least amount of effort. This could be used to explain the minimal amount of time spent by some participants in this study looking for heath information on the Internet.

### Implications for Health Care

Administrators of health care institutions and healthcare administrators need to be aware if they are not already, that patients are trying to be more active participants in their own health and therefore, do utilize the Internet, including websites and other types of social media to obtain health information. In today's competitive health care market, hospitals and other providers need be aware of who their consumers are and to offer relevant health information on their websites and other social media to their advantage and to supplement information being provide by health care providers. Organizations need to provide accessible, credible, information that is available on a variety of devices to those consumers which they are serving.

### Implications for Nursing Practice

Education is inherent in a nurse's role. Internet health information seeking, gathering and health service utilization is relevant for ED nurses, ED physicians, ED Residents and even first responders. The Institute for Emergency Nursing Research (INER) lists as one of their goals is to generate, translate, integrate and disseminate research relevant to Emergency Nursing Practice (www.ena.org/practice-research). Nurses need to be aware of the Internet sites that are currently being used by their patients so they can assist in determining what sites would best meet the needs of the individual patient's based on demographics and health state.

### Implications for Nursing Research

The results from this study and the newly developed model are anticipated to serve as a foundation for other nurse researchers to conduct further research that supports, refines and extends the newly developed model, thereby generating further nursing knowledge. Additional research on a larger scale is needed to validate if and how online health information gathering correlates with ED utilization. Other areas that nurses could further research focus on include Health Informatics, the linking of information technology, communication and healthcare that could potentially improve the quality and safety of health care and Telehealth as a communication technology that could deliver health and education services.

### Future Research Directions

ED patients are a large population whose needs are still understudied. There is still much to be learned in regards to health information seeking, perceived symptom severity and utilization of ED services. Future studies could focus on patient's perceived expectations and satisfaction with services rendered. If providers become more aware of what their patients expect after conducting an online information search, providers could work in conjunction with patients and facilities to provide educational information on hospital based websites so consumers are well-informed with credible health information and assist patients in making healthcare utilization decisions that are cost effective while at the same time, better meeting consumer needs.

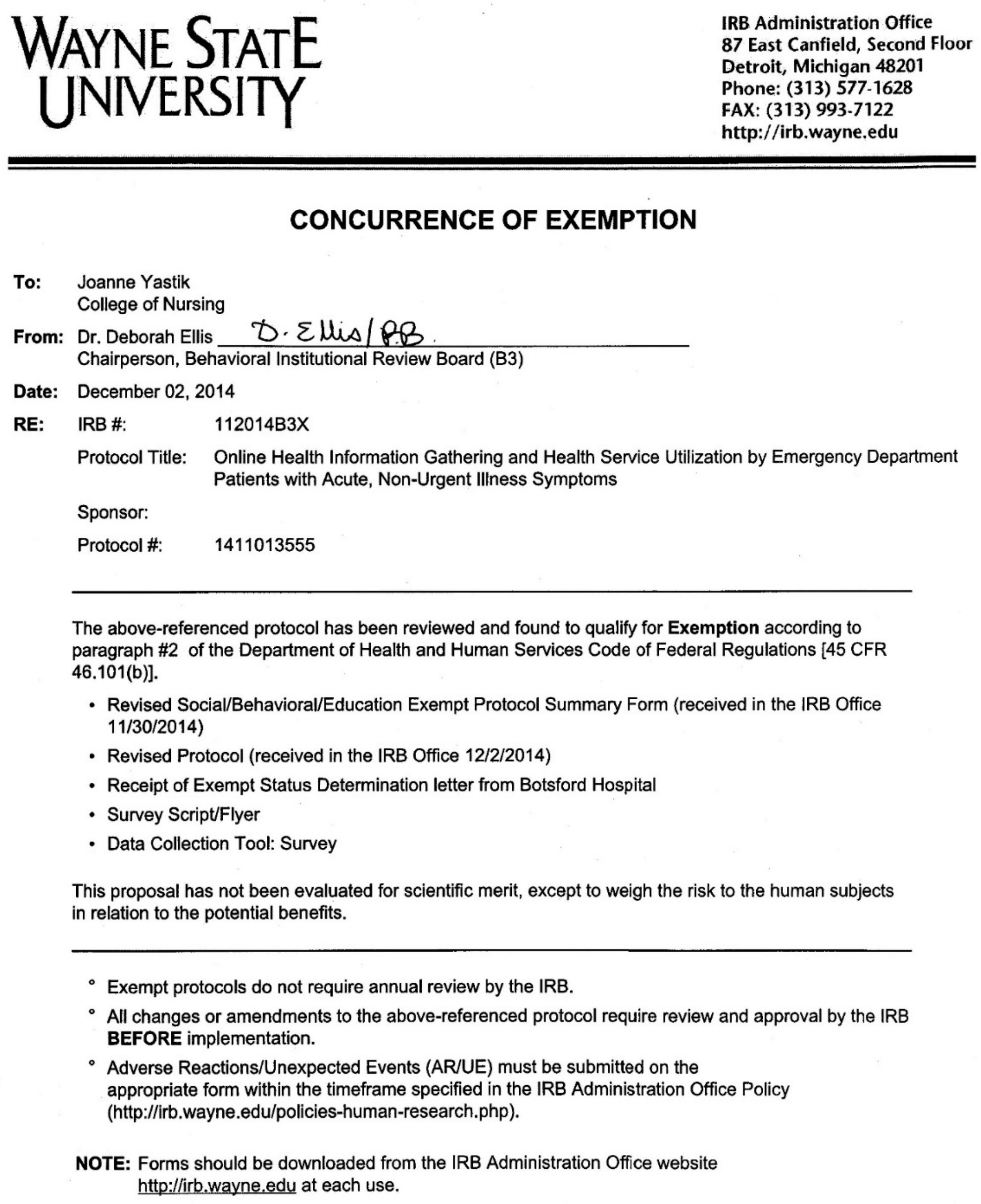
## Conclusion

The purpose of this study was to examine the online health information seeking practices of ED patients when experiencing acute, non-urgent illness symptoms. This study utilized a newly developed model of health information seeking and health service utilization model integrating two existing models. The main focus of the study was to look at the concepts of Demographics, Need State and Health Service Utilization. As only a few components of the model were investigated, it is necessary that this research continues to address other components of the model that may yield new insight into this topic. Based on the findings of this study, topics both to extend the current research and identification of new topics, have been identified. Future research should look into how health information seeking influences health management (Anker, Reinhart, & Feeley, 2011). Therefore, further research is still needed to investigate how health information is being used and the link between online health information seeking and health service utilization, including location of and appropriateness of the level of care.

The topic of internet health information seeking, information gathering and health service utilization is multi-faceted and continues to remain fertile ground for research. The Internet should never be a substitute for health care by trained providers but used in conjunction to aid consumers in their quest for knowledge, to be more active participants in their own health or as an educational tool. The abundance of and availability of online health information can only add to more knowledgeable patients and to improve overall health outcomes.

## APPENDIX A:

## APPROVAL LETTER FROM WAYNE STATE UNIVERSITY HUMAN INVESTIGATIONS COMMITTEE (HIC)



WAYNE STATE UNIVERSITY

**IRB Administration Office**
**87 East Canfield, Second Floor**
**Detroit, Michigan 48201**
**Phone: (313) 577-1628**
**FAX: (313) 993-7122**
**http://irb.wayne.edu**

### CONCURRENCE OF EXEMPTION

**To:** Joanne Yastik
College of Nursing

**From:** Dr. Deborah Ellis D. Ellis / PB.
Chairperson, Behavioral Institutional Review Board (B3)

**Date:** December 02, 2014

**RE:** IRB #: 112014B3X

Protocol Title: Online Health Information Gathering and Health Service Utilization by Emergency Department Patients with Acute, Non-Urgent Illness Symptoms

Sponsor:

Protocol #: 1411013555

The above-referenced protocol has been reviewed and found to qualify for **Exemption** according to paragraph #2 of the Department of Health and Human Services Code of Federal Regulations [45 CFR 46.101(b)].

- Revised Social/Behavioral/Education Exempt Protocol Summary Form (received in the IRB Office 11/30/2014)
- Revised Protocol (received in the IRB Office 12/2/2014)
- Receipt of Exempt Status Determination letter from Botsford Hospital
- Survey Script/Flyer
- Data Collection Tool: Survey

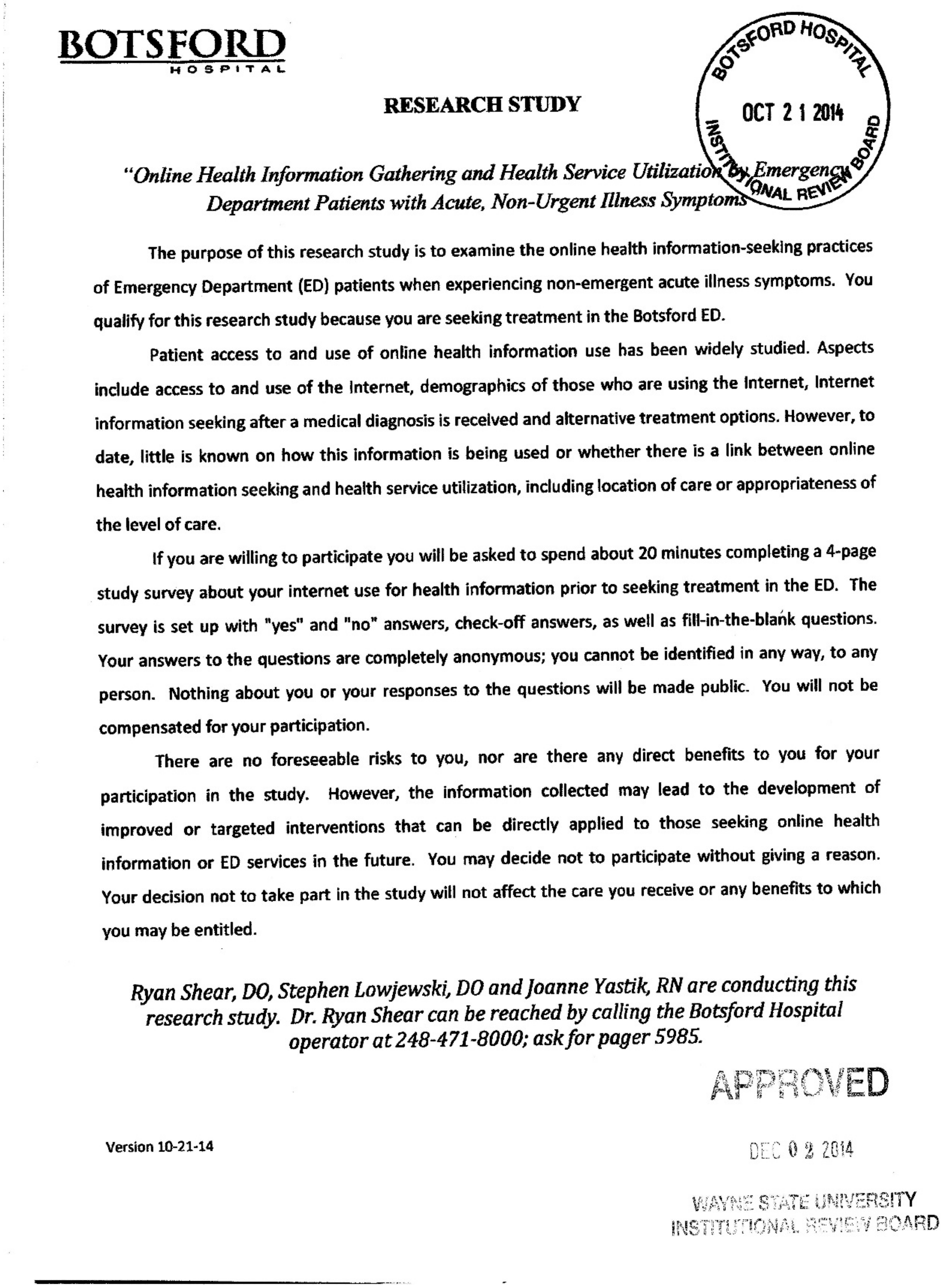
This proposal has not been evaluated for scientific merit, except to weigh the risk to the human subjects in relation to the potential benefits.

- Exempt protocols do not require annual review by the IRB.
- All changes or amendments to the above-referenced protocol require review and approval by the IRB **BEFORE** implementation.
- Adverse Reactions/Unexpected Events (AR/UE) must be submitted on the appropriate form within the timeframe specified in the IRB Administration Office Policy (http://irb.wayne.edu/policies-human-research.php).

**NOTE:** Forms should be downloaded from the IRB Administration Office website http://irb.wayne.edu at each use.

## APPENDIX B:

## APPROVAL LETTER FROM BOTSFORD HOSPITAL INSTITUTIONAL REVIEW BOARD



BOTSFORD HOSPITAL

BOTSFORD HOSPITAL INSTITUTIONAL REVIEW BOARD
OCT 2 1 2014

**RESEARCH STUDY**

*"Online Health Information Gathering and Health Service Utilization by Emergency Department Patients with Acute, Non-Urgent Illness Symptoms"*

The purpose of this research study is to examine the online health information-seeking practices of Emergency Department (ED) patients when experiencing non-emergent acute illness symptoms. You qualify for this research study because you are seeking treatment in the Botsford ED.

Patient access to and use of online health information use has been widely studied. Aspects include access to and use of the Internet, demographics of those who are using the Internet, Internet information seeking after a medical diagnosis is received and alternative treatment options. However, to date, little is known on how this information is being used or whether there is a link between online health information seeking and health service utilization, including location of care or appropriateness of the level of care.

If you are willing to participate you will be asked to spend about 20 minutes completing a 4-page study survey about your internet use for health information prior to seeking treatment in the ED. The survey is set up with "yes" and "no" answers, check-off answers, as well as fill-in-the-blank questions. Your answers to the questions are completely anonymous; you cannot be identified in any way, to any person. Nothing about you or your responses to the questions will be made public. You will not be compensated for your participation.

There are no foreseeable risks to you, nor are there any direct benefits to you for your participation in the study. However, the information collected may lead to the development of improved or targeted interventions that can be directly applied to those seeking online health information or ED services in the future. You may decide not to participate without giving a reason. Your decision not to take part in the study will not affect the care you receive or any benefits to which you may be entitled.

*Ryan Shear, DO, Stephen Lowjewski, DO and Joanne Yastik, RN are conducting this research study. Dr. Ryan Shear can be reached by calling the Botsford Hospital operator at 248-471-8000; ask for pager 5985.*

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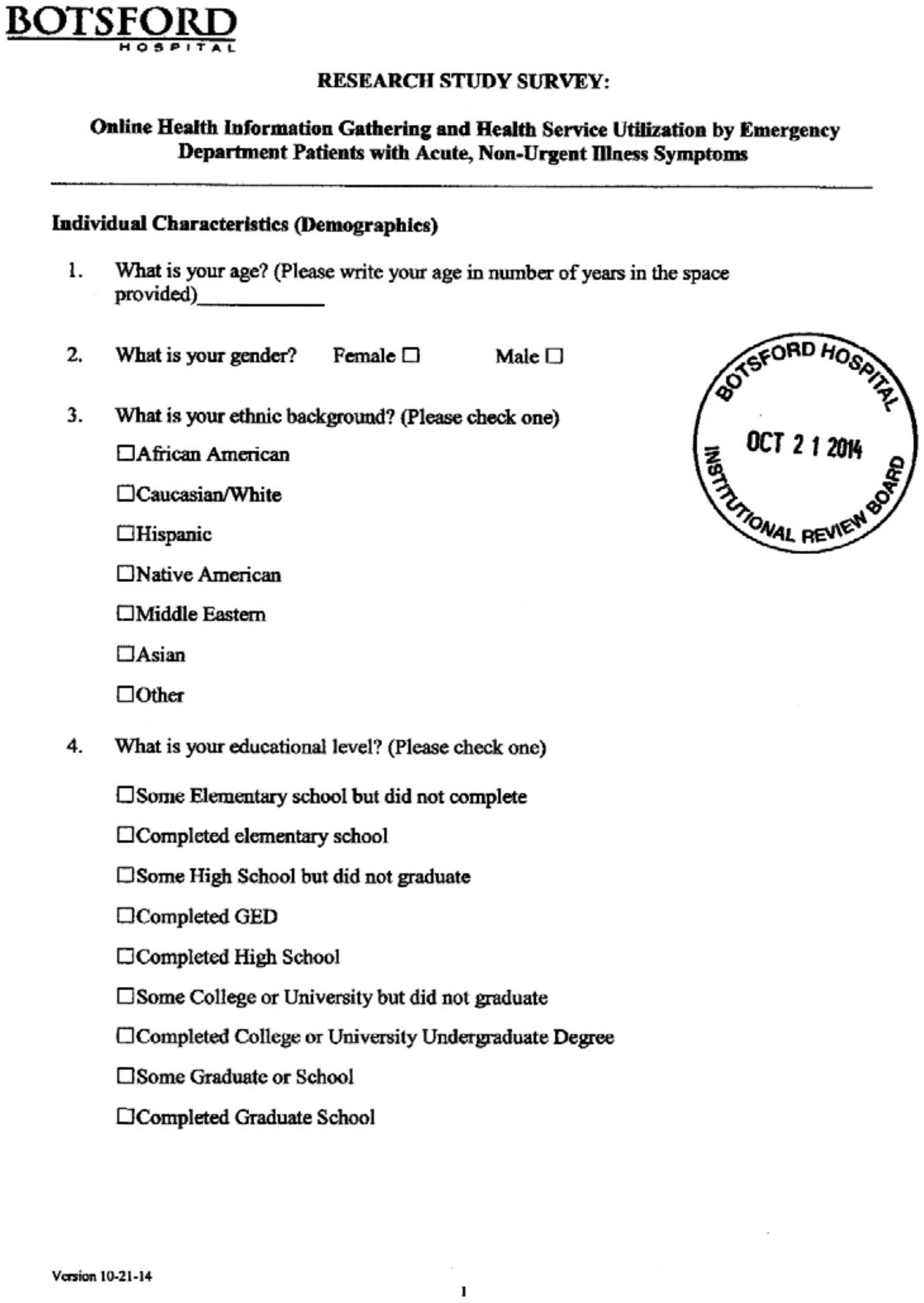
## APPENDIX C:

## ONLINE HEALTH INFORMATION GATHERING SURVEY



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**RESEARCH STUDY SURVEY:**

**Online Health Information Gathering and Health Service Utilization by Emergency Department Patients with Acute, Non-Urgent Illness Symptoms**

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**Individual Characteristics (Demographics)**

1. What is your age? (Please write your age in number of years in the space provided)____________

2. What is your gender? Female ☐ Male ☐

3. What is your ethnic background? (Please check one)

   ☐African American

   ☐Caucasian/White

   ☐Hispanic

   ☐Native American

   ☐Middle Eastern

   ☐Asian

   ☐Other

4. What is your educational level? (Please check one)

   ☐Some Elementary school but did not complete

   ☐Completed elementary school

   ☐Some High School but did not graduate

   ☐Completed GED

   ☐Completed High School

   ☐Some College or University but did not graduate

   ☐Completed College or University Undergraduate Degree

   ☐Some Graduate or School

   ☐Completed Graduate School

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## RESEARCH STUDY SURVEY:

## Online Health Information Gathering and Health Service Utilization by Emergency Department Patients with Acute, Non-Urgent Illness Symptoms

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### Symptom Characteristics

9. How long have you been experiencing the problem or symptom(s) you are having that led you to come to the ED today? (Please check the one that best indicates how long you have had this problem in both hours and days)

☐Less than one hour

☐1-3 hours

☐3-6 hours

☐6-12 hours

☐12-24 hours

☐One day

☐One to three days

☐Three to seven days

☐More than one week

10. On a scale of 1- 5, with 5 being the most serious/severe, rate your perception of the severity of the problem you were experiencing (Please check the number that best represents how serious you think your problem is)

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

11. How soon after your problem or symptoms began did you begin to look for information? (Please check one)

☐Within the hour

☐1-3 Hours

☐3-6 hours

☐6-8 hours

☐12-24 hours

☐Longer than 24 hours

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**RESEARCH STUDY SURVEY:**

**Online Health Information Gathering and Health Service Utilization by Emergency Department Patients with Acute, Non-Urgent Illness Symptoms**

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12. Do you consider this problem to be (please check one)
Emergent ☐ Urgent ☐ Non-Urgent ☐

13. Do you use the Internet for general information about health, such as diet or exercise?
(Please check one) Yes ☐ No ☐

14. Did you begin your search for information on a search engine such as Google, Bing or Yahoo? (Please check one) Yes ☐ No ☐

15. Approximately how much time did you spend looking on the Internet for information about your problem/symptom? (Please write in your answer in the spaces provided)
__________minutes__________hours

16. Please include the names of any websites you remember visiting.__________________
______________________________________________

17. Did you talk with anyone about the information you found? (Please check one)
Yes ☐ No ☐

**Seeking Medical Services**

18. Did you try to treat this problem yourself at home prior to coming to the ED?
(Please check one) Yes ☐ No ☐

19. Did you consider any other locations of care besides the ED for this problem?
(Please check one) Yes ☐ No ☐

20. Within the past 12 months, not counting today's visit, approximately how many times have you been to an ED for care? (Please write in the number of times you have been to an ED for care in the following space provided) ______________

21. Did you use the health information you found on the Internet to determine whether you should come to the ED today? (Please check one) Yes ☐ No ☐

22. Did the information that you found on the Internet influence your decision to come to the ED today? (Please check one) Yes ☐ No ☐

# Thank You!

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## ABSTRACT

# ONLINE HEALTH INFORMATION GATHERING AND HEALTH SERVICE UTILIZATION BY EMERGENCY DEPARMENT PATIENTS WITH ACUTE, NON-URGENT ILLNESS SYMPTOMS

by

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Statement of the Problem: The influence of the Internet on our global society cannot be overstated. One of the most utilized areas on the Internet is the quest for health information (Bouche & Migeot, 2008; Goldman & Macpherson, 2006; Warner & Procaccino, 2007, Seckin, 2014). To date, little is known on how this information is being used or whether there is a link between online health information seeking and health service utilization, including location of care or appropriateness of the level of care. As ED patients comprise a large proportion of those seeking health care, and it is recognized that many ED visits are not appropriate, and costlier when compared with other locations of care, it is imperative that current research examines the potential correlation of online health information seeking with ED health service utilization. The purpose of this research was to examine the online health information-seeking practices of Emergency Department (ED) patients when experiencing acute, non-urgent illness symptoms.

Methods: This study used a quantitative research methodology with a descriptive/correlational design. An investigator-developed questionnaire was used to measure online health information seeking and the decision to utilize the Emergency Department. Seventy-four patients were surveyed with a mean age of 43.

Results: Overall findings were consistent with demographics of Internet users in that 74% of participants utilized the internet for health information, with 24.3% reporting use of WebMD. Women and those with higher education are more likely to utilize the Internet for health information. Abdominal pain, chest pain and headache emerged as high frequency symptoms as reasons for ED visit. Information found on the Internet was not a determinant when seeking care in the ED. Nearly 98% of participants reported their perceived symptom severity as emergent or urgent. The amount of time participants spent seeking information was widely varied and should be the basis for future research.

Conclusion: The findings will provide a foundation for other researchers investigating ED patient use of online health information. Findings can be used to tailor education to improve patient's online health information seeking and ED utilization experiences.

# AUTOBIOGRAPHICAL STATEMENT

I have been a Registered Nurse since 1988 and have always believed in furthering education for the purpose of advancing yourself, gaining more knowledge within your clinical specialty, and remaining a lifelong learner. I began teaching clinical in 1997 while completing my Master's in Nursing Administration. I realized at that time that I had a passion for teaching and educating the next generation of nurses. After several years of adjunct clinical teaching, I decided to pursue a full-time faculty role. Upon taking a full-time faculty position at the University of Detroit-Mercy in 2004, I began a post-Master's certificate in Teaching in Nursing Education. After completion, I began the doctoral program at Wayne State in 2006 as several of my colleagues were enrolled or completing the program. The program foci of urban health, self-care, and caregiving all aligned with my educational values and research interest areas. I have taught at the undergraduate level in both associate and baccalaureate degree levels, accelerated second degree, and RN to BSN completion. I hope to inspire all of my students to further their education.

As an ED nurse of 16 years, finding the right topic to pursue for my doctoral studies was a challenge. A background in ED nursing affords many opportunities to pursue education and research in a variety of directions. While there were specific health conditions, the topic of ED crowding is one that has always intrigued me. This combined with the emergence of the Internet and availability of Internet for health information that was accessible to all struck a winning combination. As the Internet and technology continue to grow, this topic will allow me to begin a program of research in this area.

Completion of this program was one of the greatest challenges I have experienced. I faced many hurdles along the way, both personally and professionally. I truly enjoyed all of my courses while in the program, including my cognate course in Health Communication and Communication Theory. I had the opportunity to work with exceptional educators and researchers along the way and I hope to continue to conduct research in this and other areas of interest. I am grateful to have completed a PhD in Nursing from Wayne State University.