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# Use of Secure Messaging By United States Veterans and Significant Others

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USE OF SECURE MESSAGING BY UNITED STATES VETERANS AND  
SIGNIFICANT OTHERS

By

Claudia S. Derman

A Dissertation Submitted in  
Partial Fulfillment of the  
Requirements for the Degree of

Doctor of Philosophy

In Nursing

at

The University of Wisconsin-Milwaukee

December, 2014

## ABSTRACT

### USE OF SECURE MESSAGING BY UNITED STATES VETERANS AND SIGNIFICANT OTHERS

By  
Claudia S. Derman

The University of Wisconsin-Milwaukee, 2014  
Under the Supervision of Professor Karen H. Morin, PhD, RN, ANEF, FAAN

The purpose of this study was to describe the topics discussed using secure messaging (SM), the pattern of use of SM, and whether the themes discussed and/or the pattern of use varied based on gender and age of the SM user. Secure messaging is an example of a technology that focuses on patient-centered communication. Secure messaging allows patients to communicate with their clinicians using the Internet and at their convenience, while maintaining the privacy of the information exchanged. Secure messages, if approved by the patient, may also be written by family members or significant others for the patient. By its nature, the use of SM is indicative of an individual's involvement in their healthcare, utilizing self-management skills. Few studies were found that reported on the content of messages written by patients or their families. No studies were found that reviewed the topics patients write about in these secure messages nor were studies found that tracked the number of messages written by patients and relating to the days and time that were most utilized.

A review of 1200 secure messages written by veterans and their caregivers was undertaken to determine what information was contained within the secure messages. The 1200 messages contained 1720 themes that were grouped using content analysis to

yield a total of ten topics. The day of week and the time of day of messages were additionally reviewed by gender and age of the individual. Messages written by friends of family members were reviewed and compared to those written by patients.

The topic most addressed as that of medications, with more than one-third of the 1720 themes within messages relating to medications. Veterans aged 55 to 64 years were the greatest users of the SM system followed closely by those between the ages of 65 to 74. Men wrote most frequently about medications while women wrote more themes related to the topics of complaints and concerns and consultations with specialists.

Pattern of use of relative to time of day and day of the week was also reviewed in subset of the sample ( $n= 600$ ). The most common time frame during which messages were sent was between 9:00 a.m. and 6 p.m., accounting for more than 70% of all messages. Tuesdays and Thursdays were the most often utilized days of week for SM.

The implications of this study include revisiting how MyHealthVet is configured to enhance the veteran's ability to communicate effectively and appropriately with healthcare providers. It is possible that participants employed SM rather than other identified means to contact providers as they were assured of a response within a defined period of time. Findings have implications for users, clinicians, hospital administrators, and technical staff. The purposes of SM can be revisited with users, clinicians may wish to consider alternative strategies, and administrators may wish to revisit the current structure in terms of identifying a method to sort the information contained in SM.

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## DEDICATION

This dissertation is dedicated to  
Ben, Rachel, Sarah, Sophie, and Mia

I am sorry I missed so much time with you over the last several years. Please know, as evidenced by this paper, that you can do anything if you put your mind to it. I hope this will inspire you to always reach further—as you have inspired me;

And thanks to Beth and Joe for their patience.

This paper is also dedicated to my cousin Mary Ellen who kept encouraging me.

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## **Chapter 1**

### **Introduction**

Nurse-patient communication is vital as it contributes to improved health outcomes (Robinson, Callister, Berry, & Dearing, 2008). Moreover, the nature of this communication is client-centered because patients are the focus of the interaction (Rogers, 1951; Rogers, 1957; Sheldon, 2009). Expand the personnel to include all healthcare providers, which include nurse practitioners, physicians, physician assistants, and the need for patient-centered communication becomes essential to practice and patient care. Healthcare communication is no longer limited to face-to-face, one-on-one discourse; closed-captioned home visits or tele-health occur, with telephones having long been used to address patient concerns (Eysenbach, 1999; Weiner, 2012). The advent of sophisticated technologies has spurred the development of telemedicine and tele-health practices in healthcare, changing healthcare delivery for many patients and providers (Bashur, Shannon & Sapci, 2005).

The intent of this chapter is to introduce secure messaging (SM) as an example of sophisticated technology that focuses on patient-centered communication (Brennan, Downs, & Casper, 2010). SM allows patients to communicate with their providers via the Internet, while maintaining the privacy of the information exchanged (Tsai & Rosenheck, 2012). The topic is introduced and some background information on SM is provided. The problem is explicated. The research questions are introduced, a theoretical framework is discussed to lend support, and the significance of the study is considered from several nursing perspectives.

### **Problem Identification**

The problem discussed is that the use of secure messaging within health care is a relatively new technology that has not been studied prior to being fully embraced. As the use of computerized technology has increased, Klein, Conn, and Sorra (2001) point out that many organizations fail to fully implement the innovations they adopt. Klein et al. point to the fact that organizations fail to gain employees' skilled, consistent use, and commitment to innovation at times because the organization does not fully study and support the implementation. The authors also point out that users of these systems do not always fully understand the application of the innovation. By focusing on the use of the SM, the technology will be better understood and may be clarified for users of the system. Review of the outcomes of this study should assist organizations in planning future iterations or updates to the SM system—from both the system and users' viewpoint.

Pew Research reports that 80% of Internet users look on the web for health information (Fox, 2012). In 2009, Eysenbach described consumer health informatics (CHI) as the branch of health informatics in which consumers' needs for information are analyzed. Eysenbach included in CHI the methods for making information accessible to consumers as well as for integrating consumers' preferences into medical information systems. CHI is seen as essential to the engagement of patients in their healthcare (Veinot & Souden, 2012). Gibbons et al. (2009) discuss that CHI applications can enhance the efficacy of interventions delivered by clinical staff, and support the individualized and personalized tailoring of information as well as behavioral feedback.

**Background.** The use of electronic mail (email) for communication between providers—specifically physicians—and patients was first mentioned in the literature in the mid-to-late 1990s (Kane & Sands, 1998; Mandl, Kohane & Brandt, 1998; Pallen, 1995), and is seen as one of the first uses of CHI (Ferguson, 1998). In 1994 Neill, Mainous, Clark, and Hagen investigated electronic mail and reported that electronic mail was perceived by patients as increasing the speed, the convenience, and access to medical care. Coiera (1995) reported that 46% of Californians employed email in their daily lives and suggested that it held potential for additional communication between physicians and their patients.

Email, as commonly used by the general public, is not secure. This security awareness issue was identified during the mid-1990s, as personal information became more available on the Internet (Kane & Sands, 1998; Mandl, Kohane, & Brandt, 1998). A server may be used to increase privacy and safety of the personal information, but connections between servers are not necessarily secure and third parties may intercept email messages. Using email safely today also requires special encryption processes to protect individuals' privacy (Fitzgerald, Goins, & Herold, 2007).

Cognizant of the impact of published personal information on the Internet, in 1996 the U.S. Department of Health and Human Services (HHS) began the process of establishing standards for health information (Gostin, 2001). The standards included securing health information and protecting the privacy of individuals to whom the information belonged (Lumpkin, 2000). In 2003 the final bill that included the privacy rule, named the Health Insurance Portability and Accountability Act (HIPAA) was passed, and remains in effect today (Solove, 2013). HIPAA established national

standards to protect individuals' electronic medical records and other personal health information (HHS, 2002).

Implementation of HIPAA has had a profound impact on tele-communication. As a result of HIPAA it is no longer professionally appropriate, from a privacy standpoint, to use email for patient-provider communication (Ralston et al., 2009). To address this concern, one recent CHI effort to enhance communication between healthcare providers and patients has been through the use of secure email, called secure messaging.

The availability of large volumes of detailed and explicit electronic health information has been accompanied by privacy concerns for facilities of all sizes (Malin, El Emam & O'Keefe, 2013). A layer of security around an organization's computer servers involves the routine use of what is referred to as a firewall (Kindberg, et al., 2002). Despite the name, a firewall is a software barrier to keep destructive forces away from an individual's computer and information, and works with a router program to examine each network packet of information to determine whether to forward it toward its destination (Nayak, Reimers, Feamster, & Clark, 2009). However, email messages transmitted using Simple Mail Transfer Protocol (SMTP) and File Transfer Protocol (FTP) move through most firewalls without restriction (Singhal, Winograd & Scarfone, 2007).

Secure File Transfer Protocol (SFTP) is the secure way to move data (Bass & Berlich, 2007). This step for protecting private information involves the use of encryption systems in the form of keys, to change messages into encoded text. The text is encrypted by means of an algorithm (Henry, 2007). Thus no one other than the

receiving party who has the key in the form of an access code can translate, or decrypt the text and convert it into comprehensible text (Benaloh, Chase, Horvitz, & Lauter, (2009).

**Secure messaging.** Secure messaging (SM) is the latest outcome of security concerns. It is a protected electronic communication format that allows the use of messages, similar to email but protected through a secure environment (Zhou, Garrido, Chin, Wiesenthal, & Lang, 2007). SM adds further security measures, such as a web portal, to ensure patient privacy. A secure web portal allows only authenticated users accessibility to all manner of data (Bass & Berlich, 2007; Gao, Greenspan, Welsh, Juang, & Alm, 2006).

The Veterans Health Administration (VHA) employs SM within its patient information website, MyHealthVet (MHV). The MHV program is a personal health record (PHR) located on a secure website. Within it are many avenues to find, record, and compile health information which can then be viewed by the veteran. Among the options within MHV is the ability for patients to send and receive secure messages from providers and healthcare team members. This type of messaging system meets requirements of HIPAA for protection of personal information (AMA, 2010).

Within the VHA's SM program, a user, who could be a patient, family member of the patient, friend of the patient, or a provider, initiates a message. The secure message is dated and timed internally by the program. The user includes a SM subject line for the message being created. Users also have the option of continuing to write secure messages by adding on or replying to the provider's reply message. Thus a "volley" of messages is begun, with all additional conversations attached to the original message. This string of messages is also referred to as a SM thread.



The use of SM within the Veterans Health Administration (VHA) has been evaluated based on number of messages and by turnaround time. Both of these measures are recorded on a weekly basis and the results are shared with hospital administrators. These reviews may be important but don't always reflect how SM is used functionally by either patient or health care provider. Moreover, there appear to be some factors that may influence SM usage. Gender and age are particularly relevant factors to this study.

The use of the Internet to retrieve health information, messaging with healthcare providers, and work within a personal health record (PHR) varies by gender. Review of studies related to gender and healthcare demonstrates that women tend to use more healthcare services and spend more healthcare dollars than men (Cylus, Hartman, Washington, Andrews, & Catlin, 2011). Women have more incidents of acute illness and require more long-term care (Cherepanov, Palta, Fryback, & Robert, 2010; McGlynn, 2003; Owens, 2008). Survey statistics compiled by the Pew Research Internet Project, 2013 demonstrate that women were more likely than men to research health information on the Internet—79% versus 65% for men (Fox & Dunnan, 2013). Women were more likely than men to refill a prescription and make an appointment online, as well as to communicate with a healthcare provider using the Internet (Cohen & Stussman, 2010).

Age of individuals may impact the use of SM. Looking at an early healthcare system that utilized SM with patients demonstrated that SM users were likely to be middle aged, between 50 and 65 years of age (Ralston et al., 2009). At a military treatment facility, the average age of SM users was reported as 40 years, though the sample was drawn from mostly military clients (Agarwal, Anderson, Zarathemetete, & Ward, 2013).

Weppner et al. (2010) chose to look at the use of SM by older patients with diabetes, using the Epic® systems product for electronic health records. They found that men in the 65 to 69 year old age group of had the highest use of SM, which was slightly more than one secure message sent to their provider per month. In a study at a large medical site, Nielsen, Halamka and Kinkel (2011) found that the mean age of SM users with the diagnosis of multiple sclerosis was 45. One outcome of a summit for consumer health information noted that computer users greater than 60 years or those who have not completed high school are less likely to be online (Ahern, Woods, Lightowler, Finley, & Houston, 2011). A conflicting comment in the same article, noted Internet usage was beginning to increase in users more than 60 years of age and that some patients also encouraged family or friends look online for health information about them.

How health care providers use SM has received some attention. Tang, Black and Young (2006), completed a content analysis of physicians' email messages to determine if physicians' messages contained enough information to allow evaluation and management (E&M) coding for the service. These codes are published in the Current Procedural Terminology (CPT) code set to allow coding and charging for the messaging (Tang, Black, & Young, 2006). Meyer, Atherton, Sawmynaden, and Car (2012) searched for reports of research using controlled trials, quasi-randomized trials, controlled before and after studies and times series studies using email for communicating the results of diagnostic medical testing. The authors found that no studies were identified for aspects of subject inclusion, thus no analysis was even possible.

No studies have been found that describe and evaluate patient messages within the VHA's SM system. Yet, having such information is an important first step to gaining a

sound appreciation of the health potential of this medium and to provide evidence to support its continued use. To maximize SM utility, the methods of how SM was actually being used needed to be examined.

### **Purpose**

The purpose of this study was to describe the themes discussed using SM, the pattern of use of SM, and whether the themes discussed and/or the pattern of use varied based on gender and age of the SM user. The SM users in this study may be a patient, or in some cases, may be a patient caregiver, spouse, relative or friend.

### **Research Questions**

The research questions for this study were:

1. What topics do patients, family members, or friends of the patient discuss when using SM?
2. What is the relationship between SM topics discussed and gender of the patient?
3. What is the relationship between SM topics discussed and the age of the patient?
4. What are the patterns of use of SM by patients and caregivers?
5. What are the patterns of use of SM as differentiated by patient gender?
6. What are the patterns of use of SM as differentiated by patient age?

### **Theoretical Framework**

The theoretical foundation upon which this study was based is the Individual and Family Self-Management Theory (IFSMT) by Ryan and Sawin (2009). Ryan and Sawin's framework for self-management stemmed from finding gaps in the existing science. Their study included findings that even the term, *Self-management*, varied. Self-management is a multidimensional complex phenomenon that can be conceptualized

as affecting individuals, dyads or families across all developmental stages. Ryan and Sawin (2009) define self-management much as Lorig (2001, 2006) defined self-management, which is the tasks individuals must undertake to live with one or more chronic conditions.

Self-management includes condition-specific risk and protective factors, components of the physical and social environment and the unique characteristics of individuals and family member. Ryan and Sawin (2009) suggest that self-management behaviors are used to manage chronic conditions as well as to engage in health promotion behaviors. The IFSMT (Ryan & Sawin, 2009) is a mid-range, descriptive theory. The purpose of this dynamic theory is to incorporate health-related behaviors into individuals' or families' daily functioning. The IFSMT proposes that self-management is a phenomenon consisting of three dimensions: context, process and outcomes. Each dimension is comprised of several factors.

The context dimension is composed of three factors. These factors demonstrate the influence of the individual and of family engagement on the process of self-management. The factors include medical condition-specific factors, physical/social factors, and individual and family factors (Ryan and Sawin, 2009).

The process dimension is also comprised of three factors. The first is the knowledge and beliefs factor, which is a display of self-efficacy. The second factor, self-regulation, is the process used to change health behavior, such as self-monitoring or goal-setting. Finally, the social facilitation factor includes the concepts of social influence, social support and collaboration between individuals and families and their healthcare providers.

The third dimension examines outcomes. In the IFSMT theory, outcomes are viewed both proximally and distally; the proximal outcome is the actual use of self-management behaviors specific to the condition or risk and also includes symptomatology and pharmacologic therapies. The distal outcomes are dependent upon successfully having achieved the proximal outcomes. Additionally, once proximal outcomes have been achieved, the distal outcomes then include individuals' health status, their quality of life or perceived well-being, and the costs of health (Ryan & Sawin, 2009).

Ryan and Sawin (2009) caution that it is imperative to recognize the interdependence of their model's constructs and concepts. Also, they stress that many of the underpinnings of the theory are also borne out in other areas of life. There is a great deal of interdependence in this theory; each area affects the other as well as an individual's or family's method of dealing with the various dimensions.

In the current study two constructs are of interest: context and process. Context includes two concepts; physical environment and individual characteristics. The factors of the process dimension include the concepts of the self-regulatory skills and abilities along with social facilitation.

The IFSMT model is used in this study with the premise that the use of SM is conceptualized as reflecting the incorporation of health-related behaviors into routine living, a key concept of the model. Consistent with the tenets of the IFSMT, engaging in SM with a provider is indicative of caring about one's health, clarifying questions, and seeking direction from the healthcare team. Zhou, Kanter, Wang and Garrido (2010) noted differences in patient outcomes when comparing SM users with those not using

SM. Several studies have examined the use of SM among patients with chronic conditions, hypothesizing the effect of SM on self-management skills. Weppner et al., (2010) noted an increase in use of SM as morbidity increased in diabetic patients. Lin, Wittevrongel, Moore, Beaty, and Ross (2005) reported that patients with chronic conditions believed that knowledge of their condition and self-management skills improved based on SM.

Secure messaging is one method of incorporating health-related behaviors into individuals or families daily functioning. Though this study does not approach the degree of specificity of the IFSMT, the theory is used as a foundation and a framework for the investigation. The relationship between framework concepts and the variables in this study is presented in Table 1.

The dimension of context contains two factors. One factor is the Physical Environment and the other factor is comprised of Individual Characteristics. The Physical Environment is a mandatory concept. It is made operational in this study as access to SM. The use of SM requires access not only to a computer, but access to the Internet as well. This computer/Internet access can be achieved in the veteran's home, at a VA facility, or a library or other possible locations for Wi-Fi access. This is an important consideration as it lends structure to the study. This combination of user-descriptors will be used as discriminatory points to guide the answering of several of the research questions and is an assumption of the study.

The second factor considered within Context is that of individual characteristics. Individual characteristics situate users at their current point in life. The context of

Individual Characteristics is represented in the study by the user's gender and their age at the time the message was written.

Table 1.

*Select Self-management study concepts*

| <u>Dimensions</u>  | <u>Factors</u>  |                                   |
|--|---|-----------------------------------|
| Context:   | <u>Physical Environment</u>   | <u>Individual Characteristics</u> |
|  | <b>Access to SM/Internet</b>  | - <b>Age</b>                      |
|  |   | - <b>Gender</b>                   |
| The concepts of Physical Environment and Individual Characteristics together | <u>Knowledge and Beliefs</u>  |                                   |
| Process:   | - Assume self-monitoring behaviors by use of SM                             |                                   |
|  | - Assume self-efficacy in an individual's ability to utilize the technology |                                   |
|  | <u>Social facilitation</u>  |                                   |
|  | - Assume family/friend support/collaboration                                |                                   |
|  | - Assume collaboration w/healthcare provider                                |                                   |
| Distal outcomes:   | Unknown   |                                   |

---

*Note.* Variables integral to study are bolded.

The second dimension is Process. This dimension is made operational as the actual use of the ability to self-manage. Not all factors found within Ryan and Sawin's description of self-regulatory skills and abilities, knowledge and beliefs, and social facilitation are discussed in the statement of the problem. These factors are assumed and are peripheral to this study. The research questions reflect patients' ability or even their motivation to enter information into the SM system as being reflective of their participation. The research questions do not address the patients' ability to record changes in health or the fact that the individual has health as a goal. However, one could hypothesize that if individuals did not care about health, they wouldn't be interested in monitoring their behaviors, collaborating with their healthcare provider, or any of the factors in the IFSMT. Thus, the following factors are presented to lend structure to the IFSMT. The Process dimension contains the self-regulatory skills and abilities addressed by the system, and are reflected by the individual veteran while writing SM. These inherent abilities include the individual's values for health and the willingness to be observant of these while making health a personal goal.

The knowledge and belief factors are indicative of self-efficacy and the individuals' ability to self-monitor. These factors are not addressed in this study. Social facilitation in this study represents support of the individual. This support comes from within, from family and friends as well as from healthcare providers. In some cases, this support could be reflected in family participation in the process of SM, but that is not specifically addressed in this study.

The third dimension considered is Outcomes. As noted, several authors reported that patients' use of SM decreased the rate of office visits and telephone contacts



(Weppner et al., 2010; Zhou, Garrido, Chin, Wiesenthal & Liang, 2007). As more healthcare centers begin to reimburse for SM, the outcome may result in decreased office visits, resulting in financial savings for healthcare (Tang, Black & Young, 2006). However, at this point, health outcomes are not being measured in this study and cannot be determined. Based on the findings of this study, potential outcomes related to SM may be able to be explored in the future directed by the theory. Although provider office appointments related to topics written of in SM could be captured, those potential factors in this dimension are not within the scope of this study. The first step is to understand what is discussed within secure messages and how patients use the SM system.

Applying this framework of self-management will begin identifying self-management behaviors in patients in relation to the use of SM. This mid-level theory of IFSMT provides direction to this study through the concept of self-management. As such, studies related to the efficacy of self-management behaviors offer promise to improving health outcomes.

### **Conceptual and Operational Definitions**

This section contains both conceptual and operational definitions pertinent to this study. Definitions addressing the variables in this study, as well as select terms for which clarity are needed, are included.

#### **Healthcare Team**

The conceptual definition of the healthcare team for the purpose of this study is the group of staff that together care for the veteran, active duty member, or dependent (McNamee, Howe, Nakase-Richardson, & Peterson, 2012). In this study, a patient-centered healthcare team was operationalized as being comprised of a provider—

specifically, a nurse practitioner, a physician or a physician assistant—a nurse, and a clerk.

### **Pattern of Use**

The conceptual definition of pattern of use is the repeated behavior, the frequency or standard in which an object is habitually contacted or “touched” either physically or in this case, using the Internet (Don et al., 2007). In this study, pattern of use was made operational as the frequency or occurrence of use of SM by the SM User. Examples of this included a monthly habit frequency or the repeated behavior of use of SM every Monday morning or during the early hours of the day.

### **Personal Health Record (PHR)/MHV**

The conceptual definition of a PHR is an electronic, lifelong resource of health information used by individuals to make health decisions (AHIMA, 2012). But before there was a PHR, there was an electronic health record or EHR. The two are distinct, but related entities, and the content of each is not the equal of the other. To operationalize this variable, the PHR referred to is the VHA’s My HealthVet (MHV) PHR, accessible at <http://myhealth.va.gov/>. Accessing the MHV program was the method of entry into the SM process, allowing the messaging system to run from a secure website. More information about the functionality of MHV PHR is presented in Chapter 3. For consistency MyHealthVet, was referred to in this study as MHV.

### **Secure Messaging (SM)**

Secure messaging (SM) is conceptually defined as the ability to communicate with healthcare providers using the MHV web portal, which is password protected and encrypted, as well as HIPAA compliant (Nazi, 2013). SM was operationally defined as

the process of communicating in text with healthcare providers in an information-secure environment (Zhou, Garrido, Chin, Wiesenthal, & Lang, 2007). Messages received from and sent to patients, family, or dependents may, at the provider's discretion, become a part of the patient's EHR.

### **SM Thread**

Conceptually a SM thread is a set of messages (Shah, 2012). Operationally, a SM thread was initiated by an SM user (either patient or provider) as a communication to a member of the healthcare team. The team member answered the message within 72 hours. If the SM user replied back to that message and a team member did as well, all of those messages were considered to be within the same SM thread, sometimes referred to as a message string (Forstall, Christie, & Lemay, 2011).

### **SM User**

Conceptually an SM user is anyone who uses SM. In this study a SM user was a veteran, a family member, dependent, or friend, that is, a surrogate to the veteran, who read and wrote messages within the MHV secure messaging program.

### **Assumptions**

Within the aim of this study, the context concepts of ISMFT were considered to be SM users who have a desire to use the SM system. Since the study is observational, users already have a predilection for SM, and did not need to be encouraged to use it.

1. SM users or their identified surrogates enter data into their SM in an accurate and truthful manner.
2. SM users have a degree of technical skill to work with the computer.
3. SM reflects an aspect of self-management (Ryan & Sawin, 2009).

## **Significance**

### **Practice**

In 2001, the Institute of Medicine (IOM) set a path for 21<sup>st</sup> century healthcare that includes six aims for improvement in the quality of healthcare, including the idea of patient-centeredness. Patient-centeredness, similarly encouraged in 1951 by Rogers as client-centered care, has several dimensions that incorporate the requirement for patient information, communication, education, and support, as well as involvement of family and friends (IOM, 2001). All of these can be achieved through the use of SM. Patient-centered or client centered—the premise is the same; the individual is at the helm of the process.

Nurses are at the forefront of changes occurring in healthcare at this time and as nurses comprise the largest segment of the healthcare workforce, they frequently interface between patients and their access to healthcare. Nurses also have the most sustained interactions with patients (Cohen, 2006, IOM, 2011). Nurses are also the largest healthcare users of technology (IOM, 2010), ranging from care delivery methods, medication administration processes, procedures provided, and communications with other staff.

In the 21<sup>st</sup> century, technology has provided new methods to assist in patient centeredness. Timeliness is clearly an issue that can be assisted through the use of the Internet, according to the IOM (2001). While insufficiently reliable in an emergency, several of these quality aims of patient-centered care can be met through the use of SM as a communication tool.

Nursing is a key partner with patients in healthcare (IOM, 2011) and yet nurses know little regarding patients' use of SM. The first step, then, is to describe how patients and health care providers use SM. Due to the lack of research it is unclear if patients are asking the correct questions or providing the correct information to the healthcare team. Part of the way the healthcare team responds is contingent upon what the patient is writing, sharing, describing, or asking about in the SM. If the patient does not convey the correct information, the healthcare team cannot respond in a meaningful way. Results of this study could ultimately inform patients about how they can optimize the use of the SM system to get the answers they seek. Results of the study could also provide feedback to healthcare professionals on how they can also better use SM. The outcomes of this study have the potential to enhance patient-centered care in a timely and efficient manner, as suggested by the IOM. The findings of this study may also contribute to nursing practice by clarifying ways in which consumers actually use SM so when future research is undertaken, nurses as experts in the field of SM are key players in the design and implementation of studies.

This type of electronic messaging also has the potential to induce cultural changes in the transfer of information in a medical context (Kassirer, 1995). Unlike telephone calls to providers, SM allows for tangible references or hard copies of information that can be kept for patient and provider reference (Menachemi, 2011). Liederman, Lee, Baquero, & Seites (2004) noted that telephone calls to providers declined as SM increased, but at this point it is unknown whether patient or caregiver adherence to instructions was enhanced.

Communication using SM can also save money by avoiding unnecessary office visits. Zhou, Kanter, Wang and Garrido (2010) investigated the impact of SM on Healthcare Effectiveness Data and Information Set (HEDIS) outcomes. The authors found that use of SM in patients with diabetes, hypertension, or both was associated with a statistically significant improvement in effectiveness of care within a two-month time period. They also found SM was associated with an improvement of 2.0–6.5 % on other HEDIS measures such as hemoglobin A1C, cholesterol, and blood pressure control. SM is seen as being a technical change in health care as a patient-centered system which is thought to have an impact on quality improvement measures, thus it is critical to study its use.

SM is a technologic application that can facilitate communication between patients and nurses, and therefore logically falls under the aegis of nursing informatics. Nursing Informatics has been recognized as a specialty by the American Nursing Association (ANA) since 2001, (ANA, 2001). As such, nurses in this field can guide practice in informatics and specifically, based on findings from this study, in the area of SM. Additionally, informatics research studies can address consistency in nurses' practice, as well as impact the practice of informatics in other areas of health care.

### **Theory**

This study contributes to theory by employing and building upon the theoretical framework of Ryan and Sawin's IFSMT (2009) using the model of self-management to provide context. The study contributes to the knowledge base of SM by placing it within aspects of the Individual and Family Self-Management Theory (Ryan & Sawin, 2009), but from a clinical perspective. The tenets of the IFSMT are not tested in this study,

rather context, process dimensions, and the factor of individual characteristics are employed to guide the study. Self-management also includes dimensions as specified by Gerteis et al. (1993) that patients should participate in decisions regarding the type of treatment they receive, that their family and friends should be involved in their care if the patient desires, the care should be coordinated and that communication, whether in person or via “web-based communication technologies” (1993, p. 32) should be efficiently and reliably received.

### **Research**

Secure messages are an example of a relatively new technology available to consumers. As consumers continue to become more involved in their healthcare increasingly relying on internet information and communication, studies like this are needed to address consumers’ needs in this changing environment. This study provides critical, initial information about how veterans’ utilize messaging that is important to understand prior to undertaking further research related to SM.

SM is a technology being employed by more healthcare organizations, responding to the need for better privacy standards in an age of computer insecurity. Yet we don't have much evidence on the foundation or the outcomes of SM. The first step is to be able to provide some description and assessment of the use of SM.

### **Policy**

The impact this study may have on policy is, at this point, local. The outcomes of this study may impact policy at the level of this particular hospital. This is the first time that SM has been studied using the controlled structure and needs of a unique patient population.

Findings from this study should impact patient education policies within the SM system. This study may potentially influence how healthcare team members use SM. Findings may also lead to further study of the financial cost of SM, based on message topics and involvement of health care providers. These results may influence changes to the SM program. Further, as the SM system evolves and the time providers spend in the system may increase, the study may serve as a reference for policies related to health care providers and SM.

### **Limitations**

There are several limitations to this study. The numbers of SM studied are a valid sample but generalizations cannot be made to a larger sample or population (Polit & Beck, 2012). The study was undertaken at a VA in the Midwest, thus results are specific only to that site.

### **Chapter Summary**

In this chapter the importance of patient-centered care mandated by many healthcare programs was highlighted. Secure messaging is an additional technology that is beginning to be utilized to assist in providing patient-centered care. No studies were found that focused on the content of patients' SM. Identifying trends within use of SM touches on nursing, other healthcare providers, consumers and their support systems, patient education, and a myriad of options and outcomes, yet this has not been investigated.

The study concepts were defined. Research questions were posed. The significance of this study to nursing practice and theory, nursing research, and nursing policy was outlined.



## Chapter 2

### Review of Literature

The purpose of this study was to describe topics discussed using SM, the pattern of use of SM, and whether the topics discussed and/or patterns of use vary based on gender and age of the SM user. In this chapter, the foundations of SM are examined to add a historical perspective to this topic and to follow the growth of technology related to communications between providers and patients. Additional dimensions that may affect the use of SM are reviewed; these include the effect of gender on healthcare, age, and internet use. A review of health issues, many of them chronic, in the V.A. population is included, to provide perspective on common problems they experience. An introduction to the use of the VHA's MyHealthVet program is discussed as the portal to SM, to lend structure to the model of SM. Lastly self-management from various theorists is reviewed.

Information in this review is the result of electronic searches of computerized databases, library catalogues, journals, and texts used for academic and pleasure reading. To keep abreast of new publications the Internet Website Google Scholar's alerts query setting was helpful, designed to alert the investigator about journal articles related to the terms "secure messages" (SM), "self-management", "U. S. Veterans", and "consumer health informatics" (CHI). Additionally, Amazon.com routinely sends related updates of releases based on previous purchases.

The initial literature searches captured papers and texts published from 1990 through 2013. These searches included all of the following databases: HealthWatch<sup>®</sup>, which focuses on perspectives of health care and wellness, including more than 180

international and peer-reviewed journals and reports; as well as Medline, and the EBSCOhost Research Database with full text, peer reviewed references, available booklets, pamphlets, special reports and original research. The contents of these reviews included indexes and abstracts dating back to 1984, and full-text versions of information going back to 1990 (Hall, 1999). An additional literature search of the Medline and EBSCOhost databases was done searching back to the 1950s for key items related to initial studies of client/patient-centered care.

The Cumulative Index to Nursing and Allied Health Literature (CINAHL) was also used as a comprehensive source of full text articles for nursing and allied health journals. Three Cochrane sources were also used for literature searches: Cochrane Central Register of Controlled Trials, Cochrane Database of Systematics Reviews and Cochrane Methodology Register. Additional databases used for searches included: Database of Abstracts of Reviews of Effects (DARE), Health Business Elite, Health Source – Consumer Edition, Health Technology Assessments (HTA) and Library, Information Science and Technology Abstracts (LISTA). Also used for searching were MEDLINE with Full Text, NHS Economic Evaluation Database (NHS EED), and Psychology and Behavioral Sciences Collection database, Rehabilitation and Sports Medicine Source, and finally SocINDEX with Full Text.

The following entry terms were employed to obtain the broadest, most comprehensive reference listing: “secure messaging; secure email; email and providers; doctors; nurses; clinicians; messaging” and all variations of pluralized terms. Consumer health information, CHI and information and consumers were used as search terms. The Institute of Medicine’s (IOM) Website was routinely reviewed, looking for new

information, as were the AHIMA and AMIA sites, the MyHealthVet (MHV) site, HarrisInteractive Website, and Pew Research. The term “Consumer Health Information” resulted in 23,267 articles or books found for the years from 2007 until March of 2013. The term “Secure Messaging” resulted in 766 journal articles from 1998 until the first quarter of 2013. Articles with titles or abstracts including the terms “email”; “messages”; “patient”; “nurse/nursing”; “provider”; “physician”; “secure”; or “security” were honed and focused to key points cogent to the study.

Information is also presented regarding the theory on which this study is based. Self-management as a term was reviewed to remain informed of the latest research and publications. In order to obtain the most selective material for review, the newest journal articles and book sources were sought, and experts in the fields were chosen for their reviews.

### **Foundations of Secure Messaging**

Findings of the literature review are presented to provide readers with a view of past history and the present state of knowledge regarding SM. The literature review begins with a grounding in the use and growth of technology, resulting in the field of CHI as the overarching term. Then the focus moves to the use of PHR by individuals. A discussion of the growth of electronic mail demonstrates the need and requirements to move into SM to protect personal health information.

As noted previously, use of SM and the PHR reflects a degree of self-management (Ryan & Sawin, 2009). Self-management and some of the theories that describe it are reviewed to further elucidate this theory. Though some theorists have

described self-management as early as the 1970s, the review of self-management presented here begins in the 1990s.

The literature review includes additional information to provide a stronger knowledge base for a discussion of SM. Thus information about the influence of gender on healthcare is examined. Age is also discussed in relation to the use of technology. The literature then focuses on veterans and research regarding veterans served by the VA system. An introduction to the Veteran's Health Administrations' own system of PHR, MyHealthVet (MHV) is explored and explained. MHV is the platform that houses SM for veterans. Finally, points regarding of patterns of use are introduced to review the literature as it relates to routines and habits.

Every attempt has been made to provide readers of this document with a thorough platform of knowledge to grasp the structure and research around SM. Information presented moves from overarching terms, such as consumer health informatics, to address specific areas related to this study such as gender differences in health care.

### **Consumer Health Informatics**

The term "consumer health informatics" is used to describe how consumers, and thus patients, employ the computer to elicit health information (Eysenbach, 2000). Observations concerning consumer health informatics (CHI) begin to appear in the literature in 1995 and 1996 (Vaz, 1995). Refinement of the concept of consumer health informatics resulted in a field that analyzes consumers' need for information, studies and implements methods for making information accessible to consumers and integrates consumers' preferences into medical information systems (Eysenbach, 2008). Consumer health informatics experts study and implement methods of making information

accessible to consumers and integrate consumers' preferences into health information systems. Consumer health informatics can potentially empower patients to make informed choices (Dolan, Wolter, Nielsen & Burrington-Brown, 2009).

Findings from a review of the CHI literature by the Agency of Healthcare Research and Quality (Gibbons et al., 2009) reveals that using CHI applications could help improve health care processes such as medication adherence, and serve as an "early warning system" to practitioners for patients with declining clinical conditions. Gibbons et al. (2009) further indicated that Internet users with chronic health issues, such as those with cancer, diabetes and mental health disorders, benefit from using patient-focused electronic tools to support health improvement. The authors suggest that CHI applications may engage consumers and enhance traditional clinical interventions as well as improve both intermediate and clinical health outcomes.

Xie (2009) discussed the use of CHI by adults greater than 60 years of age with respect to face-to-face encounters with medical professionals. Xie looked at consumers' perceived need for health information and proposed that the Internet has broadened options and venues used in decision making. Xie asked individuals in discussion groups how best had they had their questions regarding health information answered: by their provider or through use of the Internet. The answer was a combination of the two. Xie suggested that the use of the Internet has not changed older adults' reliance on medical professions for health information—though the author suggests that some of that reliance is perpetuated by the providers. Based on his findings however, he noted that older adults have a continued preference for reliance on individual healthcare providers as the source of their healthcare information needs. This author did not support use of CHI for

adults over the age of 60, who, according to Xie, obtain better health information from their provider than from the Internet.

Adams (2010) provided insight into consumers' use of health information online. The author suggested that health related institutions, agencies, and web designers exercise caution in the development of CHI. The author reviewed the use of implicit and explicit blogging on specific blog-sites as a case study example. Bearing in mind that blogs themselves often contain subjective information, *implicit blogging* was defined as the use of blogs available to the general public on health-related issues or practices, such as exercise, nutrition, and weight loss. The author defined *explicit blogs* as those designed with a particular health situation in mind, such as pregnancy, leukemia and included Internet sites directed at self-management of a disease such as diabetes. Two case studies were developed to present trends in CHI—one looked at open documentation on an implicit blog related to general weight-loss. The other case study, an explicit review, evaluated a health website associated with specific diseases that afforded users an Internet location to record their medical information and experiences. Based on the reviews of the websites and users, the author cautioned developers to examine interactive website from users' perspective to determine importance and evaluate their methods of using the sites and why they are used. Adams suggested that further investigation into online CHI use needs to occur and should be grounds for future research activity not only by healthcare providers but also by insurers, health-related businesses, and policy makers.

Consumer health information is an area showing significant growth within the Internet, as well as the medical and nursing literature. Fox (2013) reported that 81% of American's have access to the Internet and 72% of adults with access have looked online

for health information in the previous year. Pew Research also reported that 19% of smartphone users have downloaded an application or “app” to either track or to manage their health (Fox, 2013). Gibbons et al. (2011) point to the fact that consumers bring intelligence, access, and a myriad of issues to CHI. These three analyses all note the increasing use of health information searches by consumers in a positive and beneficial manner.

In the literature, CHI is viewed most frequently as an area that has grown in use, but not necessarily in comprehensibility or accuracy. Only Xie (2009) pointed to a preference in older adults for finding health information directly from their providers. Another study related that users of CHI search utilizing the Internet and CHI applications such as WebMD, WebMD Baby, WebMD Allergy, Pregnancy, Pain Coach, Medscape, Medline Plus Connect (Burgess et al., 2012) and more Websites that have proliferated as applications on mobile phones and as websites become increasingly available to consumers.

### **Personal Health Records**

A discussion of use of SM by patients requires a brief look at computerized personal health records (PHR), as several of the PHRs such as the MyChart<sup>®</sup> program attached to the Epic<sup>®</sup> electronic health record (EHR) include the option of SM (Bushhousen, 2013). The security of the platform on which the PHR is built enables the safe use of messaging between provider and patient, or not, as has been shown (Beard, Schein, Morra, Wilson & Keelan, 2012).

A personal health record can be a paper based tool or may be accessed through a personal computer or housed on an Internet web site (Zulman et al., 2011). Some PHRs

are stand-alone systems (Do, Barnhill, Heerman-Do, Salzman & Gimbel, 2011). These are referred to as unidirectional systems and only the consumer inputs information for record keeping. Other PHRs are bidirectional and may interact or upload patient information to a health-system-based electronic health record (EHR) (Martino & Ahuja, 2010). This type of PHR is housed within a larger healthcare network where providers may view the information and the patient may view or add information to the larger, health center-based medical record (Emani et al., 2012). Some PHRs, such as Kaiser Permanente's My Health Manager<sup>®</sup>, allow consumers to communicate with providers to refill prescribed medications, view dates for upcoming healthcare appointments, and access portals for medical information and education through the use of electronic mail (Kaiser Permanente, 2009). MyHealthVet has similar features.

There is an increased financial incentive for physicians and hospitals to adopt EHRs and this is referred to as "meaningful use" (Diana, Kazley, Ford, & Menachemi, 2012). Meaningful use is defined as EHR use by providers to achieve significant improvement in care (Blumenthal & Tavenner, 2010). Eligible professionals can receive up to \$44,000 through the Medicare EHR Incentive Program and up to \$63,750 through the Medicaid EHR Incentive Program (Blumenthal, 2010) towards purchase of an EHR. Through the Health Information Technology for Economic and Clinical Health (HITECH) Act, the federal government is making this money available in incentive payments to providers and hospitals (Glaser, 2010). HITECH began in 2011, yet incentives will be offered until 2015, when penalties may be levied for failing to demonstrate use of EHR technology (DesRoches, Worzala, & Bates, 2013). The increase in EHRs will concomitantly increase the number of tethered PHRs.



To assist consumers who may receive healthcare services from multiple providers and sites, several countries' healthcare organizations support the *universal serial bus* device (USB) for patients to use as a PHR. Sometimes referred to as a thumb drive or jump drive in the United States, a USB maintained PHR in Spain, the United Kingdom, Australia and Japan allows patients to carry their PHR with them (Jara, Zamora, & Scarmeta, 2011; Jian et al., 2012; Steele, Min & Lo, 2012).

In the generic sense, and in the U.S., personal health records (PHRs) are files created and maintained by an individual patient or consumer, based upon the individual's understanding and recording of their health condition, allergies, medical and surgical problems, medications, medical tests and procedures (Zuckerman & Kim, 2009). A PHR differs from an electronic health record (EHR), in that an EHR is maintained by a provider or provider organization as part of a large database containing records of all patients or consumers within the group, whereas a PHR is maintained by the individual (Schnipper et al., 2012). Presently, the VA's MHV combines some EHR data with SM and PHR capabilities, and is a bidirectional system with a high level of security.

The first computer-based PHRs appeared in the late 1990s in the form of consumer oriented Web sites (Brennan & Starren, 2006; Hunter, 2002). Consumers were charged a fee to assemble and deposit their own healthcare data into these Web sites. The majority of the early PHRs did not prosper. Of the 27 PHRs identified by Kimmel, Greenes, and Liederman (2005) in existence in 2000, only seven remained less than three years later. Yet today, the use of electronic PHRs is increasing (Zulman et al., 2011). Overall, Markle Foundation (2011) reports the use of PHRs has increased from 3% to 10% since 2008. Kaelber, Jha, Johnston, Middleton, and Bates (2008) report that nearly

fifty million people have access to MyChart<sup>®</sup>, a PHR tethered to Epic<sup>®</sup> System's EHR, and another twenty million veterans access the VHA's PHR. Thus evidence supports the increased use of PHR by the American public.

One reason for the increase in the use of PHRs is that health care institutions are now beginning to develop electronic PHRs that enhance patient centeredness by allowing users to review medical test results, encourage medication refill requests and permit clinical messaging with providers (Emani et al., 2012). As a result, proprietary industries have begun to spend significant time and money forecasting the future of PHRs (Lewis, 2011, Pirtle & Chandra, 2011) and sometimes, as in the case of Google Health (Lewis, 2011), are wrong despite their best planning. Quoting federal healthcare reforms that call for specific care options to set the stage for a "tipping point" leading consumers toward rapid adoption and reliance on personal health information management resources, Frost and Sullivan (2011), a firm that provides customer-dependent market research and analysis along with growth strategy consulting, suggested it is time to venture into the PHR market both in the US and abroad. Other organizations such as Blue Cross/Blue Shield, and the American Medical Association (AMA), also rate the advantages of PHRs (BCBC, 2012; Jones, Shipman, Plaut & Selden, 2010, Wilson, 2008).

Security of the health record itself can be an issue when a PHR is maintained via the Internet. By placing secured personal health data on the Web and allowing patients and providers to access them, PHRs create an infrastructure for the productive sharing of health information, but also the potential of sharing with unknown others as well. Personal health records that are tethered to any healthcare network or provider must follow all requirements of the Health Insurance Portability and Accountability Act of

1996 (HIPAA) (Jacques, 2011; OCR, 2000). That is not the case with a stand-alone, un-tethered PHR. When using an electronic PHR, multiple individuals such as caregivers and family members may add and view information to the record. What of others who may inadvertently or maliciously gain access to another's record?

PHRs are a melding of technology and CHI. With a PHR, a patient may review medical test results, refill medications, and some systems allow direct messaging with providers. This review of the growth of PHRs is important to understanding the current study and the method of SM used in this study. SM requires a PHR that can securely maintain the privacy of personal information of the message. Security of the PHR in the current study was assured using a tethered EHR.

### **Electronic Mail**

Electronic mail, more commonly referred to as email, has been employed in health care for some time. Its use has been traced to the year 1972. An example of an early adapter, Lockett (1973) writes in the journal *Popular Science* of the use of electronic mail by a physician in the previous year's issue; he described the electronic mail and likens it to "a dream world thought not likely to be experienced in our lifetimes". Referred to as electronic mail, Lockett described a system that used telecommunications to transmit letters, pictures, graphs, and invoices that "look just like the original".

More than 20 years after Lockett, Pallen (1995) argued for the use of electronic mail in healthcare and listed beneficial effects of communication via email for medicine, nursing, and other clinical settings, noting that it can reach its destination in minutes thus obviating the need to purchase a stamp. Additionally, Pallen noted that junk email was

so rare, that “reading email requires barely any time” (Pallen, 1995, p.487). In the British Medical Journal, Pallen detailed how to make one of the most common emoticons, that is “smileys”, and at that early date suggested the use of an encryption system to maintain patient privacy. Also in 1995, Coiera asked colleagues to increase research in the arena of human communication processes to improve delivery of health care using email.

In 1998 potential issues related to electronic patient-physician communication were being discussed (Mandl, Kohane, & Brandt). Though touting convenience of email and benefits of involving patients in their own health care, the authors also raised issues related to confidentiality. Mandl, Kohane and Brandt furthered the discussion of public keys to protect patient information. Shortly thereafter the U.S. Department of Health and Human Services (HHS) began the process of establishing standards for health information (Gostin, 2001) that impacted email: the use of public keys became required in all segments of the health care industry in 2001. Encryption of personal health information is now required to protect personal information through the use of private and public keys (Henry, 2007).

In the year 2000, the online journal, *Journal of Medical Internet Research* was in its third year of existence. In it, two articles were of note. The first was a review of anesthesiologists’ responses to an unsolicited email sent to them from an unknown patient (Oyston, 2000). Fifty-four percent of the anesthesiologists responded to the message sent from a person unknown to them giving some type of advice, 78% of them within 48 hours. Oyston warned of the potential for malpractice in offering advice to unknown people. In a discussion in that same issue, Kuszler (2000) cautioned physicians of legal issues resulting from responses to unsolicited email messages. The author

reviewed common law legal risks of responding and offering advice or diagnostic suggestions to patients through use of email. Additionally Kuszler suggested that email holds promise as a mechanism by which to review patient progress and response to treatment.

There has been considerable discussion in the literature about the need for specialized security to protect patient privacy when using email (Ahern, Woods, Lightowler, Finley, & Houston, 2011; Argawal, Anderson, Zarate, & Ward, 2013; Ralston et al., 2009). Mattison (2012) discussed the risks and benefits of email correspondence with patients in clinical social work practice. Though no evidence was presented supporting one approach over the other, Mattison suggested academic training courses to improve techniques with communicating electronically with clients.

Kane and Sands (1998) published a list of best-practice recommendations for use of email. Their work was the outcome of a task force within the American Medical Informatics Association (AMIA) charged to develop guidelines for the use of clinic and patient electronic mail. These guidelines were later adopted by the American Medical Association (AMA) and included the use of privacy and encryption, printing and filing a copy of message and response, avoiding anger, sarcasm, instruction of patients to place category of transaction in subject line such as prescription, appointment, billing issue, and other cautions. A review was then made of the messages sent by physicians to determine if they had followed best-practice guidelines for use of email (Menachemi, Prickett, & Brooks, 2011). Messages from 2005 were compared with messages written in 2008 and the physicians themselves were queried. Respondents from a group of 7,000 physicians reported use of email, increasing from 16% to 20% over four years' time.

Physicians who reported using email “frequently” did not change; that number remained at 2.9%. Those who did not use email were asked of their future plans to do so.

Compared with earlier results in 2005, a greater proportion of physicians in 2008 indicated not being interested in using email in the future; 53% in 2005, increasing to 58% in 2008. Women physicians were more likely to use email than physicians who were men. Comparison of best-practice categories between 2005 and 2008 demonstrated that rates of use of the guidelines *decreased* in each of the 13 categories and significantly decreased in 2008 for four of the guidelines. No reasons were given for the variability in the use of email and the abandonment of guidelines for email messaging.

Not only has email use been investigated but so too has content included in email messages. Sittig (2003) reviewed email for a branch of Kaiser Permanente Northwest. The purpose was to measure the workload encountered by clinicians as a result of messaging, to count the number of words in each messages, and to determine if the requests of providers by patients were fulfilled. At the time of the study all messages were transferred via standard email protocols, thus they were unencrypted. Also, all employees could login, read, and respond to providers’ messages, that is the system was not secured. At an earlier time, 1999, and not connected to this study, another group of researchers developed a taxonomy of patient requests within the Kaiser Permanente system. This taxonomy amounted to identification of 11 varying requests for information, eight requests for action and eight categories of physician replies. These were examined and found to be useable in this 2003 review of patient/provider emails. Five physicians agreed to participate in the study. Sittig analyzed the content of all messages; counting words in each message, the type of request, and number of requests

made by patients. The physicians received a mean of 40 messages in the month. The mean number of messages from any single patient was 1.5 messages. The content of the message contained 139 words. Patient request fell mainly into three categories: 26% were requests about medications or treatments, 22% were request about symptoms or diseases and approximately 20% were request for actions regarding medications (e.g. “I’m running out of this medication”). The other findings of reasons for requests were not mentioned in this review. With a low level of evidence, the author concluded that email would save office visits and physician time.

White, Moyer, Stern, and Katz (2004) reviewed email communication between patients and providers at the University of Michigan. One aim was to investigate the purpose of patients’ email messages to their providers, that is, administrative versus clinical themes. Secondly the authors wished to determine if the content and tone of the messages were appropriate, that is formal, informal, courteous or other. White, Moyer, Stern and Katz reviewed a total of 273 messages to determine if patients followed the specific guidelines the authors had developed to improve email use with their providers. The authors stated that due to the year of the study there were no encryption protocols used, thus no secure messaging occurred. Patients were simply advised to not discuss sensitive issues when emailing providers. White, Moyer, Stern and Katz found that over 40% of the 273 messages were “updates on condition” to their physician. Prescription refills accounted for 24% of the messages. Questions about procedures comprised 13% of messages while requests for referrals were 9% of message texts. The category of “other” accounted for 9% of messages and included thanks and apologies from patients, while only 5% of the messages were requests for appointments. The reviewers found

content and tone appropriate and that nearly all messages were limited to a single request. The authors concluded that email as a tool would grow to be used by patients and providers in appropriate ways in the future and would improve efficiency and effectiveness in medical care.

Mittal et al. (2010) studied email communication skills in rheumatology fellows. The purpose of the study was to determine the quality of the fellows' responses to a simulated email question to measure the level of communication skills and professionalism in each fellow's reply. Content of messages was scored on an 18-item instrument. The instrument included the content of the AMIA/AMA recommendations mentioned by Kane and Sands (1995) as well as several additional items such as backup of information, not sharing professional email accounts with family, telephone number and other points. The maximum achievable score was 18. The average score received by fellows was 10.6, with a range of 3-16. Most messages were found to be concise, but not formal in tone. The authors cautioned that though emails were to be for non-urgent requests, it is possible that serious situations could arise via email and result in medical liability. In this study, 92% of fellows identified the medical emergency but only a third made an active effort to resolve the issue by calling the patient themselves or by the office staff. Less than one third of the medical fellows offered a telephone number for follow-up. The outcome suggests that communicating via email is not an intuitive skill. Also, as was mentioned in the review by Mattison (2012), the suggestion was made that there was need for education for clinicians to learn how to respond to email messages and that further assessment of provider skills should be made.



Zhou, Kanter, Wang, and Garrido (2010) studied patient outcomes at Kaiser Permanente. The investigators reviewed email communication using a more secure email system. The sample of email communications was drawn from patients with either diabetes or hypertension and their providers. The investigators measured nine outcomes to determine if they met the Health care Effectiveness Data and Information Set (HEDIS) criteria. The use of email between clinicians and patients was associated with improved HEDIS measures ( $p < 0.0001$ ) of 2.4% to 6.5% improvement on hemoglobin A1C screening and control, low-density lipoprotein screening and control, renal screening and nephropathy screening.

The evolution of email use in healthcare since the 1990s brings this topic into focus for this study. From simple beginnings, studies reflect providers not wishing to engage in email technology as reported from mid-2000s by Menachemi, Prickett, and Brooks (2011) to an improvement in health outcomes through the use of email in the Zhou, Kanter, Wang and Garrido study in 2010. Security while writing messages has been stressed since the beginning to protect patient privacy (HHS, 2000). Messages have been studied to ascertain how physicians respond to email messages from hypothetical patients. Of particular interest is work from 2004 by White, Moyer, Stern, and Katz. Those authors reviewed 273 email messages between patients and providers and reported that the majority of messages written by patients were updates on their status while almost a quarter of those email messages were requests for prescription refills, demonstrating a trend in what types of information patients feel comfortable handling via email.

### **Factors associated with SM**

Many factors may influence the use of SM in health care (Adams, 2010; Cohen et al., 2010; Xie, 2009). This study is based on SM utilized within the VHA. While it is still true that a majority of veterans obtain health care outside the VA, most veteran research is conducted in VA health care settings (Washington, Sun, & Canning, 2010). Two characteristics that can be used to describe the population that may use SM when seeking care are veterans of various age ranges and by gender.

**Gender and health care.** Women make the primary health care decisions in two-thirds of American households (Walter, 2012). They account for 93% of all over the counter pharmaceutical purchases (Skoloda, 2009). Women are more likely than men to choose the family's healthcare insurance (Kluger, 2010). Gender differences in health care are reported throughout the literature (Crimmins, Kim, & Solé-Auró, 2011; Cylus, Hartman, Washington, Andrews, & Catlin, 2010; Martinez et al., 2012; Mattocks et al., 2011; McDermott et al. 2011). Review of statistics in 2006 indicated that nationally, 22.8% of men and 11.8% of women did not make health care visits to a provider's office, emergency department or utilize home visits (Pinkhasov et al., 2010).

Women's health contributes a large proportion of the cost of national health care overall, not solely in veterans (Owens, 2008; Pinkhasov et al., 2010; Shen, 2013). Reproductive health generates 16% of overall health plan costs, which is more than cardiovascular disease, diabetes, and asthma combined (Owens, 2008). Women, on average, live five years longer than men (Moller, Fincher, & Thornhill, 2009). There is no significant difference in obesity between genders, however the National Health and Nutrition Survey found a significant increase in obesity in those over the age of 60 as

compared to those younger (Ogden, Carroll, Kit & Flegal, 2012). In 2010 the American Heart Association reported that since 1984, the number of CVD deaths for women has exceeded those for men. From 1996 to 2006, death rates due to CVD (ICD-10 I00 –I99) declined 29.2%. In the same 10-year period, the actual number of CVD deaths per year declined 12.9% (Lloyd-Jones et al., 2010).

Because of the longer life expectancy and the increased incidence of stroke with age, older women, veterans and non-veterans, are more likely to bear the morbidity of stroke related disabilities (Silva et al., 2010). More women than men suffer recurrent strokes within five years of their first stroke in all age ranges greater than 40 years (Persky, Turtzo & McCullough, 2010). In 2005, stroke accounted for 1 out of every 17 deaths nationally, but women accounted for 60% of the stroke deaths (Cherepanov, Palta, Fryback, & Robert, 2010).

Autoimmune diseases are a group of 80 different inflammatory disorders that are reported to be steadily increasing in veterans and non-veterans (Dube et al., 2009). Nearly 5% of the world's population develops an autoimmune disease and of this number almost 80% are women (Fairweather, Petri, Coronado & Cooper, 2012). Hormones, specifically estrogen, progesterone and prolactin, are found to play a significant role in the development of these diseases (Quintero et al., 2012). Systemic lupus erythematosus may appear or exacerbate during pregnancy. Conversely, treatment with estrogen protects postmenopausal rheumatoid arthritis patients from active forms of this disease and osteoporosis (Walker, 2011). The prevalence of lupus and scleroderma is higher in the U. S. than in other countries, while rheumatoid arthritis is more prevalent overall in North America as compared worldwide (Oliver & Silman, 2009).

Women play an increasing role in the U. S. military and represent 15% of the active military personnel, 17% of the reserves (including National Guard) and 20% of all new military recruits; they are also one of the fastest growing groups of new users in the VA (Mayberry et al., 2011). Women veterans were reported to be studied mainly by VA funded sources or by Department of Defense (DoD) funding and the majority of research to date has addressed post-traumatic stress disorder, sexual harassment and assault, or psychiatric conditions (Goldzweig, Balekian, Rolon, Yano, & Shekelle 2006). A similar review in 2009 by Yano et al., demonstrated that those areas being researched had not changed over time. Two investigators reported on women and military sexual trauma and their ability to cope with military experiences (LeardMann et al., 2013; Koo & Maguen, 2014).

Several studies identified that women veterans are not fully knowledgeable about access to VA services (Mattocks, et al. 2011; Shen & Sambamoorthi, 2012; Yano et al., 2009). These and another study pointed to the fact that the majority of women veterans obtain their health care outside the VA (Washington, Sun, & Canning, 2010). Military sexual trauma and depression are more prevalent among women than in veterans who are men, with nearly half (48%) of all women veterans studied having screened positive for depression (Haskell et al., 2010). However, in this same research, women veterans also screened lower for increased body mass index and were less likely to screen positive for post-traumatic stress disorder. Women reported a significant problem when reintegrating into their lives post deployment (Cohen et al., 2010; Mattoks et al., 2011). The airing of sexual trauma within the military in multiple media outlets (Almsay & Fantz, 2013;

Steinhauer, 2013; Thompson, 2013) will undoubtedly and hopefully lead to further research and insight into problems that surround women in the military.

Differences between common diagnoses related to gender may impact women's use of the SM system at VA hospitals. It is not known if women use the SM system differently than men, if messages contain topics that vary from men and other factors yet to be determined. Thus, it is imperative to determine if there is a relationship between the use of SM and gender.

**Age.** In 2010, McInnes, Gifford, Kazis and Wagner conducted a secondary analysis of data from a 2002 national survey of more than 8,000 people that included an oversampling of veterans, ( $N=3408$ ). They found that 29% of veterans had used the Internet to search for health related information in the previous year. In their review younger-age, higher income, more education and better health status were positively associated with general Internet use, while education, urban living and a lower health rating were associated with an increased in health-related Internet use.

The digital divide for use of technology, ability to navigate the Internet, and access to computers and technology has been described as the gap between the 'technology haves' and the 'have-nots' (Sipior & Ward, 2013). Census data for 2009 details that 23.5% of 40 million non-institutionalized adults 65 years and greater are unable to ambulate and 15.8% have an independent living disability (U.S. Census Bureau, 2013). Those are unprecedented numbers. Of these, only 34% of those less than 60 years of age and only 17% of those greater than 60 use the Internet (Choi & DiNitto, 2013). Many of those with the Internet access reported that they had discontinued its use due to cost and/or disability. Thus, the digital divide is apparent in this group of adults.

In contrast to Choi and DiNitto (2013), other research reports that use of the Internet by older Americans is growing. The Pew Internet group reports that as of April 2012, 53% of American adults aged 65 and older use the Internet (Zickuhr & Madden, 2012). Further information in the Pew findings includes the fact that 70% of adults use the Internet daily, but those 76 and older only 34% use the Internet daily. Further, Zickuhr and Madden report that Social Networking among seniors has grown to the point where 34% of Internet users 65 and older use social networking sites and 18% of them do so daily.

Ralston et al. (2008) actually studied SM in an integrated medical practice. Review of users of the program revealed that SM users were more likely to be women between the ages of 50 and 65 years, and less likely to be insured by Medicaid. The best predictor of use of SM was for patients with the greatest overall morbidity.

In summary, understanding the current state of science is critical to understanding the proposed study. In this section, the review began by explaining what is known about the science of veterans as a group; the literature review next highlighted the specific personal health record used by veterans, MyHealthVet. It is important to understand how the MHV record is used to access SM, within the security of the MHV program. To further define variables in this research, gender and age were reviewed in the bigger framework of health and in the use of technology; women tend to spend more in terms of healthcare finances and women veterans have specific issues within the system. Age was also reviewed as part of the science of veterans and age has some impact as well on the use of technology; the older generation, specifically veterans, may not have the same degree of sophistication in the use of technology yet they are being asked to develop the

motivation and skills in order to use the service that is SM. Few have examined SM in conjunction with gender or age. This research becomes a foundational study in the evolution of the understanding of SM.

### **Habits and Pattern of Use**

Habits are a form of automaticity in responding that develops as people repeat actions in stable circumstances (Verplanken, 2006). In multiple studies early in the 20<sup>th</sup> century, readiness to learn a habit was demonstrated to be a native ability in rats (Yoskioka, 1930). Habits have been further defined as a stimulus-response association, devoid of mental representation (Neal, Wood, and Quinn, 2006). Orbell and Verplanken (2010) define three aspects of habits as being central to the definition: behavior that is frequently repeated, has acquired a high degree of automaticity, and finally is cued in stable contexts.

Repeated patterns regarding health may be damaging, such as cigarette smoking. Other repeated patterns may promote health such as eating a variety of vegetables or using the computer to communicate with health care providers (Orbell & Verplanken, 2010). The method of repeated patterns or habits demonstrates a pattern of use, reflective of healthy or unhealthy behaviors. The habit of using SM could be considered a healthy behavior. Patterns of use may be indicative of a habit, and some could argue that a habit results in repeated patterns of use.

Habits are thought to originate in the basal ganglia (Yin & Knowlton, 2006), specifically the striatum. The review of habits by Neal, Wood, and Quinn (2006) presented habits from one of three possible perspectives. The first perspective is that habitual control is the result of direct context cuing, where repeated activation builds

links in memory between context and response, an example of which would be that the stereotype of being elderly and the associated behavior that elderly people maintain a slow speed of walking. Neal, Wood, and Quinn's second perspective is that habits are implicit-goals where habits develop when people pursue a goal via a specific behavior in a specific context. Thus, those who exercise as runners will not generally pursue a class in cycling. The third perspective is the motivational value that was learned as a response to a previous reward. An obvious example of this is that of Pavlov's dogs who salivated with the appearance of the coat of the assistant who brought in food, rather than to the food itself (Zernicki, 1987).

There are two reports of research related to Internet use and time spent online (Cotton, Goldner, Hale and Drentea, 2011; Beutel et al., 2011), but none of these directly look at the habits of users. The overwhelming theme found in these authors' works has to do with negative influences of the Internet on the health of the computer user. No authors were found who study the use of Internet as a habit.

Another component of the research questions within this study is the concept of the pattern of use of SM. Pattern of use as used in this study is an exemplar of any routine use or more succinctly, the specificity of Internet use by veterans while employing SM. Patterns of Internet use was mentioned by Shah, Kwak and Holbert (2001) in an attempt to differentiate between the numbers of hours spent on line versus the pattern of the use. These authors looked at the pattern of use of the Internet as related to civic life, not related to time of day or day of week. Shah, Kwak and Holbert discovered that use of the Internet was positively related to individual differences in the production of social capital.



Pattern of use of SM was not found to have been reviewed in the literature in the manner that the term is used here, specifically the dates and times that SM is initiated by patients. Ralston et al. (2008) reviewed use of secure messaging and found that the patterns of higher *internet* usage overall across the country was associated with a younger population. However, that was not reflected in the use of SM by Ralston et al., who determined those between the ages of 50 and 65 years were the greatest users of SM.

No authors looked at a pattern of use as defined as, for example, the use of the SM or even the Internet as a whole, on Mondays versus Saturdays or noon versus midnight usage. No studies were found that reviewed this specificity of information. Thus this study will provide initial information about pattern of use of SM by veterans.

### **United States Veterans Health Issues**

Articles regarding the Veterans Administration and veterans are frequently in the daily news. At this time, allegations of lack of processing of disability claims are in the news (Briggs, 2012; Maze, 2013), thus not all information in the literature is complimentary. Research including veterans captures both positive and negative perspectives of the largest integrated healthcare system in the U.S. (Gellad, Mor, Zhao, Donohue, & Good, 2012). Health care issues experienced by veterans are explicated in this section.

There were approximately 18 million veterans in 2013 and approximately 8.3% were women (Department of Veteran Affairs, 2013). According to the National Center for Veterans Analysis and Statistics, as of June 2012, there were more than 8.5 million enrollees in VA healthcare system. More than three million of these were receiving VA

disability compensation. The Department of Veterans Affairs is comprised of 152 VA hospitals and it maintains 817 VA Community Based Outpatient Clinics or CBOCs.

Much of the research on healthcare utilization done in the last 10 years has been directed at veterans returning from Iraq and Afghanistan. As the review of U.S. veteran issues continues forthwith, it is helpful to understand the periods of conflicts being discussed most frequently. A report to Congress by Torreon dated December 2012 assists in putting current/recent conflicts in perspective. The dates of Operation Enduring Freedom (OEF), which included troops in Afghanistan and in other nations, began with U.S. military forces being deployed 10/7/2001 and are the location from which the drawdown of troops is currently occurring. Operation Iraqi Freedom (OIF) began on 3/17/2003 and on 8/10/2010 President Obama formally announced that the mission had ended.

Suicidal ideation among active duty members began to receive national attention in 2004 with several high-profile cases of veterans who killed themselves after returning home (Kleespies et al., 2011). McCarthy et al. (2012) found significant differences in rates for both rural and urban suicides among veterans. Veterans (versus all individuals) in rural areas were associated with higher suicide rates: 39.6% versus 32.4% per 100,000 person-years in fiscal year (FY) 2007-2008. A rural residence was associated with greater suicide risks, as much as 22% greater, in FY 2007-2008. Firearm deaths were the most common in rural suicides (76.8% vs. 61.5%) in the same time period.

Cohen et al. (2009) report that, in a review of 249,000 returning veterans with at least a year of VA healthcare, 21% of the returning OEF/OIF veterans had received mental health diagnoses; the most prevalent was post-traumatic stress disorder (PTSD).

The next most prevalent diagnosis was depression at 18.3%, adjustment disorder (11.1%), anxiety disorder (10.6%), substance use disorder (8.4%), and alcohol use disorder (7.3%). PTSD was more common in veterans who are men and in younger veterans. Mental health diagnoses other than PTSD were more common in women veterans. Veterans of lower rank and those who served in the Army and Marines were also more likely to be diagnosed with PTSD. Additionally, those with mental disorders had a significantly ( $p < 0.001$ ) greater utilization of all types of non-mental health outpatient, emergency, and inpatient medical services than those receiving no mental health diagnoses. Veterans diagnosed with PTSD had the greatest utilization in all service categories.

Peskind et al. (2011) studied repeated blast exposure and post-concussive symptoms. They found that impairments in verbal abilities, cognition speeds, attention, and working memory were similar to findings in patients with cerebellar lesions. Based on evidence for a link between PTSD and diminished health status, Hepper et al. (2009) studied a sample of both men and women veterans, with data corresponding to five factors linked to metabolic syndrome. These factors included blood pressure, waist-to-hip ratio, and fasting measures of high-density lipoproteins (HDL) cholesterol, serum triglycerides and plasma glucose concentrations. Inspection of findings indicated that the greater the severity of PTSD, the higher likelihood of metabolic syndrome. This is of importance in that metabolic syndrome has been shown to predict cardiovascular-related morbidity and mortality.

Elbogen, Johnson, Wagner, Newton, and Beckham (2012) analyzed data from 1,388 OEF/OIF veterans, asking about employment, annual income and debt, and used

the Quality of Life Index (Keyes, Fredrickson, & Park, 2012) to measure veterans ability to make ends meet and cover basic needs. Nineteen percent reported at least a general equivalency or high school diploma, 35% reported some college coursework, and the remaining 46% had college degree of at least an associates' level. Eighty percent were enlisted personnel and 15% were officers. Of those screened, 20% screened positive for PTSD, 17% met criteria for traumatic brain injury (TBI), and 24% had symptoms meeting criteria for major depressive disorder (MDD). The median annual income of respondents was approximately \$50,000 with 78% reporting some employment in the previous year. Seventy-two percent of participants were satisfied with their financial situation, while 58% stated they were always able to afford food, clothes, housing, medical costs, and social activities. Yet 43% also indicated that treatment costs were a barrier to obtaining psychiatric care. During the previous year, 13% had lost a job, 15% had written bad checks, and 21% had been referred to a collection agency. Veterans with probable MDD, PTSD or TBI were substantially less likely to have money to cover expenses for clothing and social activities than others and were more than twice as likely to have been referred to a collection agency. Inspection of these data revealed that veterans are at risk for experiencing not only mental health issues but quality of life issues.

Perl, in a report to Congress (2011) reported that nearly 137,000 veterans were homeless on at least one night for FY 2008-2009. On a single night in 2009, in January, 75,609 veterans were homeless. Fargo et al. (2012) also studied homelessness in veterans. Their review found that veterans are overrepresented among the homeless in the U.S. and are at greater risk than nonveterans of becoming homeless. A review of

seven areas of the country (New York City, San Jose/Santa Clara counties in California, Columbus and Franklin counties in Ohio, Denver and surrounding counties in Colorado, Tampa/Hillsborough County, Florida, Phoenix and Maricopa county, Arizona and Lansing/Ingham County, Michigan) using American Community Survey (ACS) data, resulted in findings of 130,500 homeless adults. Of that number, 10,726 (8.2%) were veterans. Veteran status, greater than 45 years of age, and black race were significantly and independently associated with risk of homelessness among both men and women.

Thorpe et al. (2012) examined the influence of veteran status in a sample of older adults with the diagnosis of schizophrenia or those having a schizoaffective disorder. Patients in the San Diego, California area were recruited to participate in the study. The veterans ( $n=373$ ) were slightly older than the non-veterans ( $n=373$ ), more likely to be married, and less likely to live in a board-and-care type of facility. There was a significant difference found between the groups regarding age at onset of schizophrenia or schizoaffective disorder, with veterans having onset later (at 27.6 years) than non-veterans (at 24.9 years). Fewer of the veterans than non-veterans indicated drinking alcohol in the morning or using most substances (sedatives, cannabis, stimulants, opioids, and hallucinogens) during the first three months preceding enrollment in the study. Veterans did report a worse quality of life score related to physical functioning versus non-veterans. However, veterans performed better than non-veterans on the performance measure of everyday functioning and cognitive tasks.

Pracht and Bass (2011) looked at avoidable hospitalizations at Florida's VA hospitals. The sample consisted of 284 veterans receiving care only at a VA and who had been hospitalized at least once for an avoidable reason, that is, the stay should have been

treated on an outpatient basis. The objective was to examine the relationship between utilization of ambulatory care and the probability that an individual was re-hospitalized for the same, avoidable reason. The investigators found that veterans who received at least one ambulatory care visit within a month of discharge were less likely to experience re-hospitalization.

Other positive outcomes for veterans included the results of Zullig et al., (2012) who studied cancer incidence between veterans and the general U.S. cancer population. Veterans cared for in the VA are older, sicker and of lower socioeconomic status than the overall U.S. and veteran population as a whole. Yet VA patients were diagnosed at an earlier stage of disease for lung, colon, and prostate cancers, relative to the general population. The researchers found the most commonly diagnosed cancers were similar in both groups (prostate, lung, colon/rectum, bladder, and skin melanomas). These findings were supported by Landrum et al. (2012) who compared survival rates for men older than 65 years diagnosed or received their first course of treatment for colorectal, lung, lymphoma, or multiple myeloma with similar fee-for-service, Medicare enrollees. The veterans had a higher survival rate of colon cancer and non-small-cell lung cancer. Veterans had similar survival rates of rectal cancer, small-cell lung cancer, diffuse large-B-cell lymphoma and multiple myeloma. Landrum et al. found that diagnosis of veterans at an earlier stage explained much of the survival advantage for colon cancer and non-small-cell lung cancers.

Finally, in relation to the present study, Houston, Volkman, Feng, Nazi, Shimada, and Fox, (2013) reviewed use of the Internet by U.S. Veterans. Inspection of results suggests that veterans represent a key population who utilize health services via the

Internet. Veterans in VA are more likely to search for health issues related to Alzheimer's disease and memory loss ( $OR = 3.07$ ;  $CI = 1.41-8.28$ ) compared to Veterans not in VA. Veterans receiving VA healthcare also reported higher proportions of social engagement related to health about tracking diet, weight, and exercise when compared to veterans not in VA healthcare system, although this was not found to be statistically significant.

Veterans in VA use the Internet for health information, and there is an opportunity to engage them more. Veterans as a population are integral to the sample of this study. Veterans performed better than non-veterans on the performance measure of everyday functioning and cognitive tasks (Thorpe et al., 2012) and that same research documents a strong correlation between post-deployment adjustment and financial well-being. Those returning from active duty have a higher degree of PTSD than those not in the military and repeated blast exposure and post-concussive symptoms seem to be a component of this (Cohen et al., 2009; Elbogen, Johnson, Wagner, Newton, & Beckham, 2012). New research is being performed on the emissions from contaminated burning wastes by the military in burn piles/pits that has occurred in both Afghanistan and Iraq (Woodall, Yamamoto, Gullett & Touati, 2012) and these environmental hazards have or in the future have been noted to affect both cardiac and respiratory function (Lepore et al., 2012). Nonetheless, it is evident that veterans as a group experience significant health issues. Use of SM may be a means of helping to address some of these issues in an expeditious manner. Moreover veterans experience long-term conditions that may be amenable to self-management.

### **MyHealtheVet PHR**

Given the literature to date, one key resource available to veterans is the MyHealtheVet program (MHV). MHV is a web-based PHR that complements the existing traditional health care architecture to improve co-managed care and to encourage veterans and their families to play a more active role in their health care (Nazi, 2010). The original MHV program, begun in 2003, allowed for uploading of vital signs and included hyperlinks to Internet information pertinent to veterans, but at that time the program did not have links to email providers nor did it allow for either prescription refill, or access to the appointment management functionality or other links that are now present. Incremental additions were made to the program and by 2010 laboratory work was available to veterans, secure messaging was instituted to allow written communication between consumer and provider, and prescription refills and appointment management functionality were all available within the MHV program. By October of 2009, over 850,000 veterans had access to the My HealtheVet site, with the total number of visits exceeding 32 million (Nazi, 2010). As of 2010, 14.5 million prescriptions had been refilled using the My HealtheVet program (VHA, 2010). But little is known about how people actually traverse this or any PHR.

Currently, MyHealtheVet is an example of a bidirectional personal health record. MyHealtheVet (MHV) is an Internet portal that is available to veterans, their families and employees of the Veterans Health Administration. MyHealtheVet is located online at <http://myhealth.va.gov/>. Like other Websites, this program may also be accessed from a veteran's home computer, but is also available at kiosks at VA medical centers and can be accessed at any computer with access to the Internet, such as within public libraries.



Compared to national statistics on general Internet use, veterans have distinct differences with the greatest users of the system. Veterans less than 40 years of age are low users of the MHV PHR. Those 41 to 50 years of age account for approximately 11% of users. Veterans 51 to 60 years account for 34% of users, while veterans 61 to 70 years of age are the largest group of users at 35%. Those greater than 71 years are 16% of the users of My HealthVet program (Nazi, 2010).

The MyHealthVet Website provides access to approved health information, condition specific information and links to three online libraries, including Medline Plus. Information on mental health issues can be easily accessed and a section is devoted to viewing videos. The Web site has links to federal and VA benefits and resources, on-line prescription refill services and the veteran's personal health journal. The purpose of the personal health journal is for participants to manage and track personal health information (VHA, 2003).

The MyHealthVet system maintains health insurance information and treatment locations. The system pulls events from past military service into the patient's MHV record to track exposures experienced and previous assignments that may relate to a veteran's health history. It displays start and stop dates of medications, dosing information and prescription numbers as well as allergy information. Medical events, discharge summaries, and health reminders may be logged and the treatments prescribed may also be included in the personal health log. Medications from non-VA providers and over-the-counter medications are entered into the system by the veteran, to compile a complete listing of all medications being taken. Immunizations received, dates

administered and any reactions may be recorded. Readings from laboratory tests and vital signs are tracked and the program allows graphing of the results.

Individuals may also enter their own personal health information into MHV. As part of a bi-directional system, participants may enter medications from outside the VHA system, but also are able to record other information. Fields are included for participants to track vital sign measurements and some lab test results that the individual follows, such as fingerstick glucose results.

Registration to access the HealtheVet program is free and requires the consumer to input demographic information as well as an initial in-person authentication. Within the privacy policy, the program stipulates that unauthorized disclosure of information may result in criminal or civil penalties. Participants' email addresses are also required for registration purposes and in the near future will be used as a tool for messaging. It is reiterated that only authorized persons in the conduct of official business may use any of the information. At the time of registration, users may request email updates of health information, based on selections within areas of interest. The internet web site utilizes several layers of security to protect personal identifiable information of registered users and can identify unauthorized attempts to access the system, change information, or the intent to cause other forms of damage to information or system security.

Inspection of information gleaned from surveys completed by veterans at initial start-up to the MHV Website, (Office of Information, 2008) reveals the following regarding users: 81% of MHV users are men, 68% are between the ages of 50 and 68 and served in the Vietnam War era. Although veterans live in all 50 states, the states

with the greatest number of veterans are California, Florida and Texas, with about one percent of veterans living outside the United States.

Use of MHV was assessed by the Veterans Health Administration's (VHA) Office of Health Information from October, 2007 to October, 2008. The American Customer Satisfaction Index (ACSI) Survey measured user satisfaction with the MHV and also identified user characteristics, preferences and needs for the program. Respondents to the ACSI questionnaire represented a random sample of site users ( $N=100,617$ ), who had navigated at least four pages on the Website prior to being asked to complete the survey. Respondents predominantly (60%) served in the Vietnam War, followed by 19% who had peacetime service. The majority of respondents were between the ages of 51 and 70 (68%) while 16% were 71 years or older. Fifteen percent were between the ages of 31 and 50. Ninety one percent were men. For the subset of users who indicated they served during the Global War on Terror ( $N=5626$ ) a greater percentage were women veterans (19%).

Nearly all (96%) accessed the MHV Website from their homes though 11% also accessed the site from their place of work. Three percent of respondents used computers situated at the VA to access the MHV Website. More than 90% of MHV users reported using high-speed internet access to connect to the Website while 7% continued with dial-up access. The majority of respondents (68%) to the ACSI survey rated their ability to use the Internet as "Advanced" or "Intermediate" (29%).

The greatest numbers of respondents (49%) to the survey accessed the MHV Website approximately once a month, but 25% stated they accessed the Website weekly. Two percent of those surveyed stated they accessed the site more than once a day.

Prescription refill was reported as the most requested service online and the top objective of the visit (75%), while pertinent to this study, is the fact that 13% of those who completed the survey stated they went to the site to record or track personal health information, such as blood pressure. However, their overall satisfaction with the Website was not assessed.

To summarize, the MyHealthVet program is a PHR that has been in existence for more than 10 years. It was designed to improve patient care and to encourage patients and their families to become more involved in their healthcare. Over one million veterans and their families utilize the MHV program for a variety of reason and outcomes. Nearly half of veterans using the MHV program access the system monthly, with a quarter of users doing so weekly.

### **Self-management**

Self-management is nearly a prerequisite to secure messaging; Emani et al. (2012) consider information self-management to be one of the primary functions of a PHR and messaging, thus secure messaging assists patients to connect as required, to their providers. The first to look specifically at self-management in the course of chronic disease was Lorig (1996). That model contains three distinguishing features: (1) dealing with the consequences of illness, (2) being concerned with the problem solving, decision making and confidence of the patient and (3) the partnership between patients and health professionals. The model clearly stated that self-management was to be “supported by medicine and public health” (p. 677.) The Lorig model differed from existing models of self-management in that its purpose was to assist patients in gaining skills and confidence to deal with their chronic disease.

Since the late 1990s, self-management has been examined in multiple populations and by multiple authors and theorists (Grey, Knafl, Lynn, Dixon & Schilling, 2011; Lorig, Holman, Sobel, & Laurent, 2006; McCorkle, Ercolano, Lazenby, Schulman-Green, Schilling, Wagner & Lorig, 2011; Mertig, 2011; Ryan & Sawin, 2009; Schilling, Dixon, Knafl, Lynn, 2009). Self-management emphasizes the individual's role in managing his or her illness, assisting with medical management, providing them with necessary knowledge, skills, and confidence to deal with disease-related problems and to collaborate with healthcare providers and the healthcare system (Lorig, Sobel, Ritter, Laurent, & Hobbs, 2001). These models all have remained true to Lorig's inclusion of three factors for self-management. In 2003, Bodenheimer listed two components of self-management education for patients with chronic disease: training in knowledge and technical skills related to their specific chronic condition and training in problem solving skills to assist in behavior change. The author stated self-management may be the most important component of the chronic care model.

Barlow and others (2002) have defined self-management as the individual's ability to manage the symptoms, treatment, physical and psychosocial consequences, and life style changes inherent in living with a chronic condition. These authors maintain that for self-management to be effective it needs to encompass the ability to monitor the condition and to affect responses necessary to maintain a satisfactory quality of life. Chodosh, et al. (2005) defined self-management as a systematic intervention targeted toward chronic disease.

In a commentary, Grey, Knafl, Ryan, and Sawin (2010), wrote that distinctions were made relative to approaches in self-management. In a commentary directed at the

authors of the specific theoretical framework (IFSMT) on which this current research is based, Grey and Knafl stated that Ryan and Sawin (2009) list the various perspectives available on the concept of self-management. At the conclusion of the commentary, all authors closed with the premise that different frameworks brought forth by the study of self-management are beneficial. The group concluded that all studies “contribute to the science of self-management and will ultimately lead to improvements to provide appropriate and effective care” (p. 3). Unknowingly, but perhaps in response to this, Shulman-Green et al. (2012) completed a metasynthesis of 101 self-management articles to detail the actual processes of self-management. Three categories of self-management processes were identified: focusing on needs due to the chronic illness, activating resources, and living with a chronic illness. Further tasks and skills were then listed as documented in the articles. Yet in this very recent article, not one of the skills included the use of computers, CHI, tracking in a PHR, or utilizing SM with providers.

The term self-management is used by investigators to convey the fact that people can successfully care for themselves. In this world of shortened hospital stays and increased comorbidities (Michaud, Goldman, Lakdawalla, Galley & Zheng, 2011) the concept of self-management becomes increasingly important. These reviews differ based on individual authors’ attempts to finely tune the concept of self-management, but the overarching goal is similar: individuals need to understand their disease and how to live with it and with their providers. SM could be a crucial component of the self-management method in that communication is key to this process. How self-management is made operational by SM users will need further exploration as SM becomes more integrated into health care.

## **Chapter Summary**

The foundation for use of specific variables under investigation for this study has been established in this chapter. Included in the review was the supporting structure of consumer health informatics, which is the footing for the study or the broadest point at which to begin. From there the review of literature funneled into personal health records that from a computerized view, support the premise of SM. The literature review then moved to the concept of self-management to augment the use of the ISMFT theory in this research; the review of self-management was completed and limited use of consumer health informatics within the concept of self-management was brought to the forefront.

To illustrate the range of experiences among veterans within this planned program of research within the VA, two basic veteran differentiators were examined. Women veterans' differences in health care needs, outcomes, and requirements were reviewed. Differences in age and use of the Internet were also evaluated for its impact on the technical aspects of SM. Finally, it has been determined by this review that no one has looked at patterns of use, as time or dates that people anywhere have used the Internet, and more specifically, no one has looked at patterns of use of SM.

## **Chapter Three**

### **Methodology**

The purpose of this study was to describe the themes discussed using SM, the pattern of use of SM, and whether the themes discussed and/or the pattern of use varied based on gender and age of the SM user. The use of SM in one specific healthcare organization is described in this study. A discussion of how and when patterns of use of SM varied based on gender and age of the SM user is explicated. A description of the design, setting, sample, data analysis, database, data collection, and analyses are provided in this chapter.

#### **Design**

This was a non-experimental, descriptive study (Polit & Beck, 2012). The purpose of descriptive studies is to observe, describe, and document aspects of a situation as it naturally occurs and that can serve as the starting point for hypothesis theory development (Polit & Beck, 2012). Grimes and Schultz (2002) said that descriptive studies often represent the “first scientific toe in the water in new areas of inquiry” (p. 145). Given the limited information available regarding SM, this design was the most appropriate to employ.

There is some degree of conflict as to whether content analysis, the form of analysis used in this review, is a quantitative design method or a qualitative one. Creswell (2011) considers content analysis a “mixed method” involving the collection of qualitative data and its transformation and analysis by quantitative means. Waltz, Strickland and Lenz (2010) write that in quantitative research, content analysis involves the systematic and objective reduction of recorded language, into a set of categories.



Where appropriate, chi-square calculations will be placed to enable comparisons of these categories (Plichta & Kelvin, 2013). Krippendorff (2013) states that he relies heavily on quantitative content analysis because “researchers working within this tradition have tended to encourage greater explicitness and transparency than qualitative scholars” (p. 90), thus this study is approached from a quantitative content analysis perspective.

### **Setting**

Secure messaging is a server-based approach to electronic communication that protects information when sent outside of a home or an organization (Zhou, Garrido, Chin, Wiesenthal, & Lang, 2007). A SM user accesses a web-based program and the communication is restricted to those who have been given access to the program. Each user is given special keys within the system, attached to their access codes, to send as well as receive messages. Secure messages within the Veterans Administration’s (VA), MyHealthVet (MHV) program begin with a subject line, similar to how any other email message is structured. Secure messages at a single hospital facility in the Midwest will be reviewed.

This particular campus in the Midwest is the only healthcare facility specifically created to care for veterans, active duty members, and the dependents of active duty members. As such, it is referred to as a federal healthcare facility, but grew out of the VA system. This unique hybrid is one facility within one of the VHA’s twenty-three Veterans Integrated Service Networks (VISN). VISN 12, the Great Lakes Healthcare System, is comprised of a network of hospitals all connected to the local Central Office of the Veterans Health Administration in Hines, IL. Comprising VISN 12 are the Edward J. Hines Medical Center in Maywood, IL, Jesse Brown Medical Center in the city of

Chicago, and Clement J. Zablocki Medical Center in Milwaukee. VISN 12 also includes the William S. Middleton Medical Center in Madison, WI, Tomah Veterans Administration hospital, Oscar G. Johnson Medical Center in Iron Mountain, MI and James A. Lovell Federal Health Care Center in North Chicago, IL. The number of secure messages sent by patients and aspects of response from the healthcare team is measured by each facility in the VISN and SM usage is also compared to other facilities in the VISN and the country. This review took place at one of the healthcare facilities within VISN 12.

Secure messaging has been in use at this hospital since July 2011. Users of SM are instructed at the time that they sign on to the system, that it is not to be used for conveyance of emergent information. Within the VA, providers are required to respond to a secure message within 72 hours per the guidelines of the MHV program. Once the time exceeds three federal business days without a response from a member of the healthcare team, the message is considered “escalated”, and is reported up the chain of command. At the start of the study 43% of secure messages were answered within 4 hours and 58% were answered within 8 hours. The number of escalated messages averaged 9% over a 13 month period. Messages have an excellent response rate overall: 99.78% of all patients’ SM are completed by the healthcare team (S. Cech, personal communication, April 17, 2013).

### **Sample**

The sample for this study was derived by identifying PHRs that met the following inclusion criteria: users must have (a) in-person authentication, (b) initiated a secure message during the following randomly chosen months: July 2012, January 2013,

February 2013, April 2013, November 2013 and December of 2013. The months studied were arbitrarily drawn from a list of the previous 18 calendar months in which secure messages had been written. The convenience sample of secure messages in this study was drawn from data of veterans, or family members who had been given permission by the user to enter into the user's PHR in the Veterans Administration (VA) program, MyHealthVet program (MHV) at a VA in the Midwest. According to statistics for fiscal year 2013, there were 51,757 unique veterans, active duty members, and active duty dependents registered for care, resulting in a total 375,958 visits to this hospital in the Midwest (D. Meeker, personal communication, March 11, 2014).

At this center, 48.09% of the veterans had registered to use SM as of January 2013. Approximately 9.7% of the active duty members and their beneficiaries also registered to use SM. A total of 10,560 secure messages had been written since March 2012 (S. Cech, personal communication, April 17, 2013). The number of secure messages varies month to month but has increased over time from 23 in August of 2011 to more than 1600 in March of 2014. Message strings to be evaluated for this study included messages begun by the user/patient.

Throughout the local VHA network, approximately 28% of user messages are responded to by a provider. At this VA nearly 46% of messages are answered directly by the provider. A listing of messages and message strings is visible on a user's SM tab within the MHV program and thus become a permanent record of their communication. Providers may determine whether the patient's communication will be added to the VHA's EHR by checking a box within their SM system. Messages saved by the provider are added to the list of progress notes in the patient's EHR.

As a federal healthcare center, this hospital also cares for active duty members who are currently serving in the military. A majority of the active duty members served are members of the Navy. Active duty family members are considered dependents of the active duty personnel and may also receive their health care at this VA. Active duty members and their dependents may also be SM users. A family member or friend may enter secure messages on the behalf of, and with the permission of the veteran. Thus, several people other than a veteran may be an SM user.

### **Data Collection**

Approval to begin this study was initiated within the VHA at the Institutional Review Board at Hines, IL (Appendix A). Approval was received from the VHA in December, 2013. Approval was also obtained from the University of Wisconsin, Milwaukee Institutional Review Board (Appendix B), which was received in January, 2014. Data collection began after both IRB approvals were obtained.

### **Data Preparation**

A Microsoft<sup>®</sup> Excel workbook was designed with the following column headings: the number of the entry beginning with the earliest message in time as 1, date of each secure message entry, an arbitrary identification code, gender of patient and age of patient. The next column addressed whether the patient entered the secure message (a Yes/No answer), while the next column addressed the question of whether family authored the message (a Yes/No answer). Following that was a question of to whom the message was sent, and a column addressing whether corroboration of the note occurred with another, verifying the reliability of the data. There were three columns used to list the themes of each message as needed: theme 1, theme 2, theme 3. At a later date,

another column was added to the workbook: theme 4. The need to accommodate a fourth theme was initially noted in message number 22. The final column of the spreadsheet contained the actual wording of the message itself, referred to as the complete concordance by Krippendorff (2013). An example of the Excel spreadsheet is seen in Table 2, with a sample of patient information entered below the headings.

Table 2

*Excel Spreadsheet Example of Record*

| Date    | ID  | Gen | Age | Pt<br>Auth<br>or | Fam<br>Author | To | # in thread | Corr<br>ob<br>w/ | Theme<br>1 | Theme<br>2         | Theme<br>3 | Theme<br>4 | Message  |
|---------|-----|-----|-----|------------------|---------------|----|-------------|------------------|------------|--------------------|------------|------------|--|
| 4/11/13 | 599 | M   | 63  | Y                |               | MD | 2           | KM               | Concern    | Requests follow up |            |            | doc I have appointment with you next week and was... |

Lists of all patients' messages written for the specific months were developed. Again, the months reviewed were July 2012, January 2013, February 2013, April 2013, November 2013 and December of 2013. The review of secure messages from these specific months resulted in a total of 1200 messages for review.

The messages were read in the EHR. Reading from a list of secure messages for the first month, July 2012, the first patient's EHR was opened. The message for the specified date was accessed. The note was read and then reviewed and copied to the computer's memory. As data could not be copied directly into the Excel spreadsheet, the message was first pasted into Microsoft® Word. In Word, all names and identifiers of the patient, family member, providers and clinician were removed. Any refill numbers for prescription drugs were deleted. Phone numbers were deleted. All paragraph markers (¶) were deleted so that the message would eventually fit within one cell in the Excel

workbook. The note was initially reviewed to ascertain the overall theme. That complete message was then cut from Word and pasted into the Microsoft® Excel workbook. Some messages were comprised of a simple phrase “refill lisinopril 40 tabs”, where other messages stretched for several paragraphs.

### **Data Analysis**

Data were analyzed using quantitative content analysis in the design (Krippendorff, 2013). Content analysis is a research technique for making replicable and valid inferences from texts to the contexts of their use (Krippendorff). Content analysis has been defined as the systematic, objective, quantitative analysis of message characteristics (Nuendorf, 2002). As a research technique, content analysis provides new insights, increases a researchers understanding of particular phenomena, or informs practical actions. Content analysis “is a scientific tool” (Krippendorff, 2013 p. 24). Content analysis pays meticulous attention to nuances and embedded meanings of every word in a data corpus and is part of the analytic process which suits this type of study approach (Miles, Huberman, & Saldana, 2014).

The process of content analysis involves several steps as detailed in the literature. The number of steps varies from author to author, though the overall information they communicate is similar: all authors have the goal of analysis concurrent with the collection of data. Some researchers delineate eight or more steps in content analysis (Waltz, Strickland & Lenz, 2010; Schreier, 2012), while others combine or remove some of the steps (Miles, Huberman, & Saldana, 2014).

In this study the following content analysis steps as listed by Krippendorff (2013) were followed: 1) unitize; define relevant units, 2) sampling, which allows the researcher

to limit observations to a manageable subset of units that are statically or conceptually representative of the set, 3) recording/coding; the reliance on the coding instructions, 4) reducing of data to manageable representations, allowing for efficient representation of large volumes of data, 5) abductive inferring, which bridges the gap between descriptive accounts of texts and the themes contained within, and 6) narrating the answers, thus making the results of the study comprehensible to others (Krippendorff, 2013). Each of these steps is addressed in research questions one, two, and three, which deal specifically with the use of content analysis.

Content analysis is sometimes done with multiple coders, who review files or texts for themes or topics. To ascertain the reliability of the work, one looks for stability, replicability, and accuracy of the coding (Krippendorff, 2013). If only one coder is used in a study, the stability, replicability, and accuracy can only be assessed as consistency across time (Schreier, 2012). For any documents in question, and periodically to assure stability, replicability, and accuracy, an additional comparison and review was completed by others. One person to assist with reliability was the dissertation chair. Two other nurses assisted with this validation process, each well versed in patient care and informatics and who will be referred to as validators. Polit and Beck (2012) equate reliability with stability, consistency and dependability. As Krippendorff's steps for content analysis were the designated method of analysis for this review, his prescribed steps were adhered to ensure both reliability and validity.

Initially a small number of messages were distributed to a validator. This nurse was told to read several messages and determine the themes contained within each patient's secure message. Once accomplished however it was found that several themes

were still noted as present in the message. Further analysis determined that the guidelines or instructions for coding secure messages required an additional, *second* review of each message. At this point the directions for how to code were revised for clarity. The revised instructions requested the validator to read an individual message and code for obvious themes contained within the message; then to re-read the message and to re-code, specifically looking for additional themes which might be present. Instruction also included the caveat to contact the primary investigator with questions or comments or need for clarification (Appendix C).

Validators were given a number of messages in a separate Excel spreadsheet to review. Coding sessions were held to review larger numbers of messages for review to assure reliability of the information coded. Initial review achieved 96% reliability testing while coding with the validators. Later reviews of larger numbers of messages included 94% and 97% concurrence on themes identified.

## **Research Questions**

### **Question One**

What topics do patients, family members, or friends of the patient discuss when using SM?

**Analysis.** This question was answered by the primary investigator reviewing each one of the 1200 secure messages to determine the multiple themes contained within each message. Content analysis was used to answer Question One. Krippendorff's (2013) six steps of content analysis were employed and are described here. A validator and the dissertation chair assisted in reviewing codes to validate themes as discussed previously.



**1. Unitize.** The units to be reviewed were determined by each message. Each message was a separate line item carried into the spreadsheet that captured the data. The unit discussed in this section is defined as a secure message, thus one secure message equaled one unit.

**2. Sampling.** This study was accomplished with a convenience sample. The sample had to be large enough to assure an understanding of issues that were important to SM users, but small enough to allow efficient analysis. All secure messages written by SM users during the months of July 2012, January 2013, February 2013, April 2013, November 2013 and part of December of 2013 were reviewed. Krippendorff (2013) states, “the units sampled are the units counted” (p. 113). Thus 1200 messages was the number of the units.

**3. Coding.** Coding of these texts was accomplished by multiple or iterative reviews of each of the secure messages, to establish a theme or themes (Saldana, 2013). As messages were copied into MS Excel, they were read first for their tone. Each message was then reread to refine the message down to the prevalent theme or themes identified within it to discriminate exactly what the patient was writing about. The overall theme of the message was identified and marked as Theme 1. If there were additional themes these were marked as Theme 2 and Theme 3 initially. By message 22 an additional, fourth, theme was identified within a message and another column in Excel was added to notate the information of Theme 4. There was nothing outstanding about message 22 containing four themes; it contained less than 130 words. But the message included information about a recent vaccine received, concern that time spent in Viet Nam could be the source of the current positive result for skin test, requests for

medication refills and information reminders for an upcoming appointment. No messages were coded with a fifth theme.

As noted, reliability of theme identification was accomplished by the primary investigator. Yet, if at any time a message with questionable themes was noted, it was marked and given to one of the validators or the dissertation chair for further review and concurrence. In all, 1200 messages were read and coded. Within the 1200 messages, 1720 total themes were identified. These themes were eventually included in a coding dictionary (Krippendorff, 2013), (Appendix D).

**4. Reduction.** Reduction was the next step in the content analysis process, and allows for efficient representation of large volumes of data. Initially 1720 themes were transferred to a multiple sheets of paper which were then cut apart into individual themes. These were then hand sorted into like-groups on a table. However, it became difficult to handle that number of pieces of paper and track them all. Thus a different method of sorting was devised. All 1720 themes were placed into a new MS Word document. Placing them in Word allowed for themes to be moved, that is, “cut” from one area and dragged or “pasted” into another section with a loosely-descriptive phrase as the topic header. This way the themes could easily be moved about and not lost. This movement or shuffling of the themes allowed for ease of reading and categorization, assuring that themes were clustered into an initial categorization of 21 loosely-descriptive topics.

**5. Abductive inferring.** This step in the content analysis process is the conceptualization that Krippendorff says bridges the gap between descriptive accounts of texts and the answers to the analyst’s questions. Krippendorff states “abductive inferences are supported by the evidence of the texts” (2013, p. 86). In this step, the

analyst reviews the relevant text, analyzes it, and then infers something from it. There is some discussion as to whether abductive inference is the right of a researcher—should the researcher simply echo back the results of what was found (Schreier, 2012). Yet, the desired outcome is an analysis of what was said, not rote read-back. Thus to use abductive inference is to analyze, reduce, and summarize what was said.

To clarify, Krippendorff (2013) suggests that the investigator begins with the written text and then maps it to initially discern the topics being discussed. That is the summarizing processes of unitizing, sampling, recording and reducing; all the steps of content analysis taken to this point. The analytic construct in this step of the process takes what the researcher “knows, suspects or assumes about the context of the text and operationalizes that presumption in order to produce inferences from the text” (p. 170).

Analytic constructs are adopted to justify the abductive inferences that content analysts make (Krippendorff, 2013). Analytic constructs are the background information that the analyst brings along, based on what the analyst knows or suspects about the text. Krippendorff cites four sources of certainty that allow a researcher to develop analytic constructs: previous successes and failures of content analysis, established theories about a context, embodied practices, and expert knowledge and experiences with a context. In this research, expert knowledge and experiences were utilized by the researcher as the certainty to develop the analytic constructs.

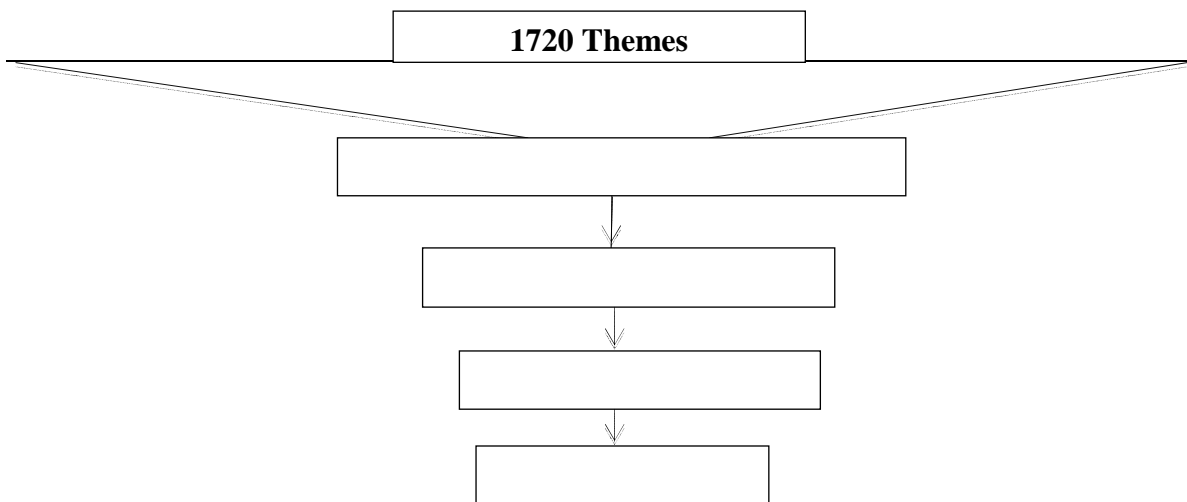
The process of abductive inferring required that the initial group of 21 loosely-descriptive topic headers mentioned earlier in the reduction step of this process be reviewed analytically. Review of the topics ensued, using expert knowledge and at times discussion with the validators. Topics were combined and collapsed. For example,

topics having similarly-toned qualities, such as consult requests, or follow up on consult, or discussion with outside specialist, or hearing aid battery requests, or support stocking or request for a walker, were combined into a more comprehensive topic. Finally, these topics were abductively inferred to a generalized topic of “Consults”. Thus the initial 21 topic-groupings were reduced and clustered, and reduced again using expert knowledge of the messages and themes. This resulted in a total of 15 topics. Those 15 topics were further reduced to 13 topics. Ultimately ten topic-descriptive names were used to label and represent all 1720 themes.

A discussion and review with the dissertation chair resulted in further analysis. Again topics were reviewed to best capture the overall topics being mentioned in SM. This final review resulted in a final analysis of the final ten topics that best described the patients’ 1720 themes. Figure 1 is a depiction of the reduction of 1720 themes into many topics. Abduction inference winnows the topics further so that to what is being captured is contained within each topic overall.

Figure 1.

*Abductive Inference Use to Depict Winnowing of Topics*



**6. Narration.** Narration is the final answer to the analysis, thus making the results of the study comprehensible to others (Krippendorff, 2013). The results of Question One were compiled. This information is presented in Chapter 4.

### **Question Two**

Is there a relationship between SM topics and gender?

**Analysis.** This analysis was conducted using a combination of content analysis and descriptive statistics. This question was answered by sorting the original Excel spreadsheet by gender. Each one of the groupings, men and women, was then moved to separate worksheets within the Excel workbook. The total messages that were reviewed numbered 1200. Of that, 1040 secure messages or 86.6% were written by men or family members or significant others of these patients. Women writers of secure messages numbered 160 or 13.3% of all messages written.

**Unitize.** The units reviewed were the messages as identified by gender of the user. The time frame for inclusion into this cohort included all message strings written during the months of July 2012, January 2013, February 2013, April 2013, November 2013 and December of 2013.

**Sampling, coding, reduction, abductive inferring.** Determination of themes written by gender required further analysis. All themes were divided into entries made by men and entries made by women. Each group of 1497 SM themes written by men and 262 SM themes written by women was then divided to determine which gender wrote what number of each type of the ten topics. Once this information was obtained, chi-square analysis was performed. These results were then calculated to determine the part of the whole for men versus women's entries.

***Narration.*** The narration becomes the explanation of what was found in the review of SM by gender. Additionally, descriptive statistics were employed to report gender outcomes for topics uncovered within the secure messages (Plichta & Kelvin, 2013).

### **Question Three**

Is there a relationship between SM topics and age?

***Analysis.*** This analysis was done in part based on the content analysis completed for Question 1. The Excel workbook was copied and pasted in another tab based on the age column with reduction being accomplished by grouping users into 10 year age categories. Within the actual sample, the youngest participant was age 27. Thus the ranges were defined as beginning at age 25 inclusively through age 34, age 35 through age 44, and on. The youngest user of SM was age 27 and the oldest was age 92, as seen in Table 3.

Table 3

*Age Range in 10-year increments*

---

|             |
|-------------|
| 25-34 years |
| 35-44 years |
| 45-54 years |
| 55-64 years |
| 65-74 years |
| 75-84 years |
| 85-94 years |

---

The data were sorted. Descriptive statistics were used to describe the users by age group. An example of the workbook is seen in Table 4.

Table 4.

*Age sort example*

| Date    | ID   | Gender | Age | Theme 1                            | Theme 2                  | Theme 3      | Theme 4 | Text of Sec<br>Mess   |
|---------|------|--------|-----|------------------------------------|--------------------------|--------------|---------|---|
| 7/6/12  | 134  | M      | 40  | Response to<br>provider<br>message | Report on<br>visit to ED | Appreciation |         | You're Priceless!<br>You are always<br>on top of my<br>health care... |
| 11/1/13 | 1022 | M      | 41  | Wants f/u on<br>labs done          |                          |              |         | I got the EEG<br>and a MRI and I<br>was...                            |

**Unitize.** The units reviewed were the themes found by age of the user during the months as previously listed.

**Sampling, coding, reduction, abductive inferring.** Using steps accomplished in Question One, the data were sorted based on age to determine themes by age range.

**Narration.** In this question the narration became the explanation of what was found in the review of SM by age. Additionally, descriptive statistics were employed to report mode, median and mean ages of use for each SM general theme, along with the standard deviation of the mean (Plichta & Kelvin, 2013).

#### Question Four

What is the pattern of use of SM?

**Analysis.** In Questions Four, Five and Six, the data analysis method as well as the sample changed. Pattern of use was reviewed in a subset of the original sample of 1200 messages. As noted in the definitions section of Chapter 1, pattern of use was operationalized as the frequency or occurrence of use of SM by the SM User. This may

have included a monthly habit or frequency of using SM, or the repeated behavior of use of SM every Monday morning, or during the early hours of the day.

To demonstrate pattern of use in this study, a subset of 600 of the original messages was created. This was done by taking the total number of 1200 messages in the sample and placing them in sequential order from earliest written messages to most recently written message. The original group of 1200 messages was divided into three segments: the first 150 secure messages, the middle group of 250 messages and the final 200 messages, and were designated as the messages to be studied. Designating some of the earliest written messages, choosing the most recently written messages as well as those directly in the middle of the sample was felt to embody an arbitrary subset, representative of all secure messages in this study.

A new MS Excel worksheet was developed. Each individual note in the subset of 600 messages was reviewed for gender and age of the users, the day of week and time of day of the secure message. The results are discussed in Chapter 4.

#### **Question Five**

Is there a relationship between SM pattern of use and gender of use?

*Analysis.* The subset first analyzed in Question Four was reviewed for this question analyzing pattern of use by gender of the patient.

#### **Question Six**

Is there a relationship between SM pattern of use and age of the user?

*Analysis.* This question was analyzed in a similar manner as Question Five: the subset was examined for pattern of use based on age of the user.



### **Human Subjects/Institutional Review Board**

Because all records reviewed were assigned a random number to identify each message, and no significant risks were posed to humans by the study, expedited reviews were requested. Institutional Review Board (IRB) approval was obtained from the Hines/FHCC IRB (Appendix A). Approval from the Institutional Review Board at the University of Wisconsin, Milwaukee was then also obtained (Appendix B).

Participants in this study were not identified. The de-identified information was recorded in both MS Word and MS Excel database by the researcher. Each of these 1200 veteran records was assigned an identification number. No identifying data was listed but the SM user's age and gender was included along with each data record. All clinician names, prescription refill numbers, phone numbers, addresses, and names of all manner of friends and family were deleted from each record.

### **Summary of Methods**

This study used the methodology of Content Analysis to identify themes in secure messaging by users at this Midwestern hospital system. The research identified the topics written about by users. The process of content analysis using the six steps as outlined by Krippendorff (2013) was used to lend structure to the process, and these steps were examined and discussed.

This is a non-experimental, descriptive study as outlined by Polit and Beck (2012). Within this chapter, the description of the planned review was documented. An introduction to the method of content analysis as described by Krippendorff (2013) was described to explicate the use of this method in relation to the first three research questions. Questions Four, Five, and Six utilize descriptive statistics as reviewed.

Individual research question approaches vary slightly in their execution utilizing the best information to provide a clear outcome. The research questions were individually reviewed and the steps planned for eliciting best outcomes for the questions was discussed.

## Chapter Four

### Results

The purpose of this study was to describe the themes discussed using SM, the pattern of use of SM, and whether the themes discussed and/or the pattern of use varied based on gender and age of the SM user. The purpose of this chapter is to present the findings of this investigation as they relate to the six research questions.

#### Description of Sample

All secure messages written at a health facility in the Midwest during the following months were reviewed; July, 2012, January, 2013, February, 2013, April, 2013, November 2013, and December 2013. The months sampled resulted in 1200 messages for review. The total age range of the group, the mean, median and mode of the group and breakdown by gender are presented in Table 5.

Table 5

*Age range (in years), Mean, Median, Mode for Age and Gender*

|       | Total<br><i>n</i> | Age Range<br>Years (%) | Mean<br>Age (years) | <i>SD</i> | Median Age<br>(years) | Mode Age<br>(years) | # Messages<br>by another |
|-------|-------------------|------------------------|---------------------|-----------|-----------------------|---------------------|--------------------------|
| Total | 1200              | 27 – 92 (100%)         | 60.97               | 12.88     | 63                    | 66                  | 77                       |
| Men   | 1041              | 28 - 92(86.6%)         | 62.27               | 12.89     | 64                    | 66                  | 77                       |
| Women | 159               | 27 - 75 (13.3%)        | 53.02               | 10.39     | 54                    | 55                  | 0                        |

Of the total messages, 86.66% were written by men, or the family or significant other of the men. The remaining 13.33% of the messages were written by women. Hospital statistics demonstrate that currently at this facility 36% of the veteran population is made up of women (D. Meeker, personal communication, March 11, 2014). There

were no family members writing on behalf of the women.

Of those men with surrogates writing messages ( $n=77$ ), 41 (51.8%) of the 77 messages were written by the patient's wife. Twenty-five messages were written by the patients' daughters, 12 were written by the patients' sons, and one was written by a girlfriend. In all, 6.58% of all messages were written by a surrogate.

Within the SM program, on both the patient and provider side, there is an ability to attach messages together, referred to as a SM Thread. Of the 1200 messages, a total of 65, or 5%, were threaded messages. The majority of the SM threads had only two messages (52/1200) within the thread. But six secure messages had 3 messages in the thread and seven messages had 4 messages in the thread.

No more than four themes were identified in any message. Review of the 1200 messages resulted in a total of 1720 themes. A total of 388 messages had a second theme while 104 secure messages included a third theme. Only 36 messages contained four themes. After gathering the baseline data, messages were analyzed using Krippendorff's method of content analysis (2013).

## **Research Questions**

### **Question One**

What topics do patients, family members, or friends of the patient discuss when using SM?

As mentioned, the total number of 1720 themes was sorted using abductive inferring. This resulted in the definition of ten specific topic names whose overall title best expressed the themes contained within. These topics reflect the purpose of abductive inference as a step within content analysis, to summarize or simplify data to produce an

organized representation of what was said. The ranked list of the final ten topics and examples of some of the 1720 themes are shown to note the association of topic and theme, in Table 6.

The topic titled Medications contained the themes of nearly 35% of all messages written. The next most frequent topic was titled Symptoms or Change in Condition, which was construed to be a reference to self-management. The third most frequently used topic was Questions, Comments or Information to the Provider.

Table 6

*Ranking (Frequency %) of Topics and Examples of Associated Themes*

| Rank | Total # Responses (%) | Topic   | Themes contained within Topic   |
|------|-----------------------|---|---|
| 1    | 594 (34.5%)           | Medications   | Refill Rx statin/Hasn't received Rx in mail                               |
| 2    | 261 (15.1%)           | Symptoms/Changes in Condition   | Symptoms, new/Update on condition: worse                                  |
| 3    | 242 (14.0%)           | Questions/Comments or Info to Provider                                    | Happy holidays/Report of fire at home                                     |
| 4    | 130 (7.6%)            | Appointments  | Squeeze in appointment soon/<br>Request for labwork to be drawn           |
| 5    | 109 (6.3%)            | Consult Requests  | Consult request: podiatry/Needs batteries for hearing aid                 |
| 6    | 97 (5.6%)             | Need Results of Test/Procedure  | Anxious for test results/Requests labwork                                 |
| 7    | 92 (5.3%)             | Reports of Outside Appointment/<br>Outside Hospitalizations/<br>ED Visits | Report on emergency visit/<br>Update on consultant visit – outside system |
| 8    | 68 (3.9%)             | Blood Glucose/Blood Pressure/<br>Vital Signs                              | Blood glucose results/Report of blood pressure results                    |
| 9    | 66 (3.8%)             | Complaints/Concerns or Problems with VA                                   | Anger with staff member/<br>Concern that diabetic rx led to cancer        |
| 10   | 61 (3.5%)             | Replies to Provider Message   | Drinking less/Emoticon  |

A subset of this information included the themes generated solely by caregivers.

There were 77 messages that were written by family members or friends of patients.

Those 77 messages resulted in 117 themes (6.8%) of the total 1720 themes overall. The

percentage of themes written by family or friends of the veteran was similar in composition to themes written directly by patients. An example is that within the total group nearly 35% of themes were related to medications, while in the subset where caregivers wrote messages, 31.4% of themes were medication-related. A smaller number of themes were related to appointments in the caregiver group (4.2% in caregivers vs. 7.6% in total group), yet monitoring of blood glucose results or vital signs at (4.9% in caregivers vs. 3.9% in total group) was similar. There were a greater number of reports of outside appointments in this group of caregivers (7.4% vs. 5.3% in total group) and more symptoms—21.4% in the caregiver group versus 15.1% in the overall group. Yet the number of comments and questions to providers was nearly identical in both groups at approximately 14% of all themes written.

When themes could fit into either one topic or another, placement of the theme was guided by the role of Analytical Constructs as delineated by Krippendorff (2013), which calls on the use of “best judgment, frequently in collaboration with another person to assure reliability”. An example of this was found in a theme listed as “Concern over starting husband on too high a dose of thyroid medication”. That message could be construed initially as belonging under the topic of medication. Following the guidelines, the investigator reviewed the actual message as written by the patient’s wife. The whole message seemed to demonstrate concern over beginning the dosage of thyroid medication at a higher dose than the wife felt was required, based on her *own* past medical history. In this instance a nurse validator also reviewed the message to assure the accuracy of the coding. The decision was made to sort this message into the topic of Complaints/Concerns rather than within the topic of Medications, as displayed here:

I received your medical record form for my husband. The last test he had showed his level of thyroid was low. Where is his level? You want him to start synthroid pill .0125. I think he is starting with too much supplement. I have been taking synthroid for about 60 years, I think .075 should be a starting point. and then work up as needed. Mrs. X As you know he does have heart problems

The information that follows is the result of compiling several steps taken from Krippendorff: reduction, narration, and abductive inferring. Each of the ten topics will be reviewed for the purpose of demonstrating the types of messages included within a topic. Selected quotes appear under each topic as exemplars of messages reviewed. Some of the following quotes are also examples of messages containing multiple themes within a single message. The goal of all this is to assist in clarifying why messages or parts of messages, in the case of multiple themes contained within a single message, were grouped under the specific topic. Topics have been cited based on frequency of use.

***Medications.*** This topic contained the greatest number of the themes elicited from SM. Of the total 1720 message themes, 594 or 34.5% of themes dealt with medications. Besides requests for refills and new medications, some patients were alert to the medications they take and asked questions about their medications and dosing, as demonstrated in this message:

Dear J Did you change my Carvedilol to 12.5 mg 2X day? I just order a refill. If it's my original prescription it may not be filled for a month. I do not have sufficient pills left for another month. I may only have another weeks worth left. Can you see if you changed my prescription level, that will have them generate a refill. Thanks.

Others questioned the need for specific medications as was noted in the following message:

After reading "The Great Cholesterol Myth" and talking to several health professionals out here in California, I strongly believe that I would be best served to AT LEAST TRY stopping Statin useage for at least 3 months. I'd like your OK for this. If you aren't comfortable with that, I would request a strong, clearly stated case for continuing useage. I should note that I am now more serious than ever about reducing my sugar intake and the ingestion of other known unhealthy foods. I want to live healthy! I truly am convinced that the rosuvastatin has more liabilities than any benefit from reduction in cholesterol (which I intend to watch closely thru diet and exercise) Secondly, would you please schedule a

visit with an urologist for late April? I am returning to Illinois on April 16th. Thanks, for your assistance!

There were many requests for refills of narcotics. The hospital only allows prescriptions for narcotics to be written for 30 days. But several of the lengthy messages about medications, this one of nearly 450 words, were for more, earlier, stronger, higher dosages, and refills.

Good morning, I know you probably think this is early to request a refill of my medication but I need them refilled so they reach me this week. The last 3-4 months I have been running out of my meds early. I need my dosage increased or my number of pills increased. I need to take at 7-8 pills of the 5mg. Oxycodone a day and this causes me to run out. so I need that increased one of those two ways. The other way we could do this is to switch me over to Tramadol. I went to see another Doctor and he gave me some Tramadol to try because I was out of my other medicine. It seemed to work pretty well and besides I was told it was not a narcotic. I had to take 4 50mg. tabs to get out of pain but it did work. I am interested in switching over to this Tramadol, but it would take about 210 50mg. tabs per month. Or 60 100mg. tabs per month. I would really like to try this, especially if I could take this and get out of pain the same as with the morphine and oxycodone. I really want to find a way to get off of these narcotics. Unfortunately, I know I will have to take something probably the rest of my life, but if I can take something like tramadol and not have to worry about all of the physical side effects that come with the narcotics then I am very very interested in doing that. If I could switch over to tramadol and get enough to were I do not have to take any Morphine or Oxycodone or Carisoprodol ro Gabapentin then I am all for it. Either way I am going to need more medication with regard to immediate release pain reliever. I really want to stop taking the narcotics and try the Tramadol because it worked well the last couple of days. I will be out of that today as well though so I need something as soon as you can send it. Additionally, I need enough to last me every month. So if we can try the Tramadol please send at least 60 100mg. tabs or 210 50mg. tabs. then you dont need to send me the Oxycodone. If I stay on the Oxycodone I will need at least 210 5mg. tabs or at least 60 10mg tabs or higher because what I have is just simply running out every month now. Please advise and we will move forward from there Thank You!! As usual thank you for your attention to this matter. Respectfully,

All VA patients receiving narcotics from a VA provider have signed an agreement to not request or take narcotics or other pain medications from providers at other facilities. Another example of a request for stronger medication includes the following message.



I seen a doctor on monday who was covering for doctor B for my shoulder pain and she prescribed me tramedal and told me if it doesn't work to let her know. It doesn't work and I need something stronger such as percaset

There are notable differences in the length of messages patients write about their medications. Length of requests varied. Some were very short, as this request of four words, is seen in the messages: “My Pain medicine 10/325” and another consisting of seven words is seen in: “ty, it’s time to refill the morphine”. This complicated message contains nearly 150 words, and mentions four other providers, changing dosages and multiple symptoms:

Hi R, I was in to see my Neurologist this week. He recommended changing my Gabapentin to 2 tablets 3 times a day. I also was in to see my internist who agreed with this. They seem to think it will help my pain. I also saw my orthopedic surgeon who convinced me that I should take the pain medications on a regular basis. He said 1 to 2 every 6 hours. It seems to have helped but sometimes my stomach gets upset. I only took 2 one time and I slept really well that night. Also My internist sent a message to Dr S regarding aqua therapy. I saw that she sent me a message but had already clicked to send ou the message first. If possible would you change the Gabepentin prescription and make it a 3 month supply instead of 1 month that it is now

There were requests for having the VA fill prescriptions from outside providers (outside the VA system) which has never been allowed. For example, “Good Morning, Received a prescription from my dentist, Z. Rx: Chlorhexidene Gluconate .12%, one 16 oz. Bottle, to be used twice daily. Can I request a VA Rx Refill or pick this up at the VA pharmacy? Thank you”. Some requests for refills were short “refill omeprazole 20mg ec cap”. Yet others as noted in several examples above were lengthy and round-about methods for procurement.

***Symptoms/change in condition.*** This section accounts for 261 or 15.1% of all themes. Less than ten percent of all themes or messages related to symptoms were positive in tone, with the majority of messages noting new or worsening symptoms and reports of pain, discomfort, or illness.

My sinus congestion and face pain continued through October. I flew to California in late October and the congestion was very painful. Dr. G gave me a week of antibiotics. It gave some relief but congestion returned after the week. He referred me to an ear, nose throat Dr. She examined me, and put a scope down through my eustation tube. I had no tumor or polyp. She subscribed astelin. Not much help. I returned to Dr. G. My ribs were aching (probably from violent, relentless coughing). He sent me to get a chest xray. Results were negative. Then I went to see Dr. K, an allergist. He looked at my medications and picked out 2 potential problems: carvedilol and flo max. I stopped the flo max and now, a week later, I am 10% improved.

The following message contained confusing symptoms within the information, which could have made it difficult to discern the intent of the message. This message spoke to perhaps an improvement in a condition as a theme of the message, even if the improvement was the result of medication:

You put me on Gabapentin/neurontin earlier this year for the nerve pain I was experiencing. Since I have been on this medication, I have had no reoccurrences of the nerve pain. If you want me to remain on this medication, I need a new refill. I also found that I only need to take it once a day, not 3 times as the original prescription was written. Can you have it just mailed to me? As far as my recent bout of the intestinal flu, I am feeling slightly better each of the last few days. The vomiting and diareha has stopped but I am still weak with very little energy. Hopefully, I will be fully recovered by tomorrow.

Another message with themes of symptoms and medications is displayed here:

i have heard now from X. i feel a little better. pls refill vicodin. i update u on pain for a lot of reasons including need for refill. i am dead sure i need a fusion in the long run. this is a fact

Other messages were comprehensive, even when expressing a theme related to some concern about symptoms.

I've noticed my heart rate 'high' and irregular since I've started down the path with prostate [sic] cancer. Since my CAT Scan, MRI's and Bone Scan I've noticed these symptoms to continue and actually get worse. I am thinking it may be the stress I am experiencing. I haven't taken my BP med's yet this morning because upon checking my BP and heart rate they came out to be 101/71 HR of 89. Last night @ 8:34PM BP= 98/77 HR = 59. Just prior to this one @ 8:05 my BP was 143/95 HR = 163. I had taken my BP med's yesterday as I usually do. so I don't know what to think of it other than I feel fatigued and at times I can feel my heart racing. All my tests with the exception of my prostate biopsy came back negative. I believe I am going to go the route of 'Radiation' treatments for my cancer, but I would like to feel better going into these treatments. I believe it is mainly stress related perhaps triggering my WPW. If you wish for me to make an appointment I will be happy to. Thank you,

Another note of respectful concern over symptoms was written by the wife of a patient, displaying the caregiver's perspective, reads:

I will do that...maybe this afternoon...I will also send a note with my observations...I hate to do it in front of him because his loss of independence is eating at him and I dont want to make him feel any worse about it...he truly is trying to do things and just cant.

The majority of messages were less positive and some were highly detailed:

Dr., this is my record and symptoms of this issue and waiting for next step. Dr. E,. 10.10.13 Injury to left temple. Branch from shrub hit the temple. 10.11.13 Friday 2 pm. Activity behind left eye like a rushing through nerves or blood vessels. Calmed down by 6 pm. Discomfort around left eye. Increased at night. 10.16.13 5 to 6 am. Head ache in upper left quarter of head. Used reflexology to ease pain. 10.17.17 headache in area around left eye was 4 or 5. took an aspirin at 2 pm. relieved pain until 6:30. pain is not noticed in daytime as at night. Some days there was no pain. 10.18.13. Annual Physcial with Dr. E Mentioned injury. identify any issues. Lab tests didnt indicate anything. 10.21.13. You mentioned that lab tests didn;t indicate any issues and that I was to check with ophthalmologist about condition of left eye. 10.25.13. Dr. W, Ophthalmologist, examined eye and determined there were no issues of any injury. 10.27.13 late in day pain moved from area around left eye to area around right eye. Pain increased to 5 or 6 level. Took aspirin. 10.28.13 Reported to you by secure messaging, the report of the condition of the eye. You suggested a ct scan. Your response was to take Tylenol 650 mg every 4 to 6 hours for pain. 10.28. 13. Worked outside with cleaning up garden plants and flowers for 4.5 hours without any discomfort for muscles. at 3 am, the pain around my head by the right eye increased to 5 or 6. Took 2 tylenol 325 mg. 10.29.13. lam took tylenol. Pain continued. Used Tai Chi for 45 minutes and was able to get back to sleep. At 5 am Pain was still at 5 or 6.Took 2 tylenol again 10.30.13 ct scan at VA clinic. Nurse L reported that there was no indication of issues to the skull or head. There was no bleeding or sign of ruptured blood vessel. Scan showed normal aging. Nurse L recommended going back to eye doctor to have the eye examined for pressure on the optic nerve as a possibility for the cause of pain. at 9 m, took 2 tylenol 325. rested until 2 am pain increased to 4 or 5 so I took tylenol. The Tylenol didn;t reduce the pain. PAIN HAS BEEN TOLERABLE IN DAY TIME SO HAVENT TAKEN MEDICATION. ct scan was good but the pain continues. What is next, sinus or digestive issues?? had diarrhea, on 10.30 at 6 pm. Just one instance. Pain during the night included area on top of my head and back down to my neck in addition to pain on brow and eye brow on right side of head. Does this tell anything? Discomfort shows up in digestive area. Tylenol doesn;t do any thing for the pain in the back of my head. 11.01.13 Dr. Warren, competent ophthalmologist, examined both eyes, checked the pressure. There were no issues or indication of anything. Dr. W checked my right eye on Oct. 25 and determined there were no issues. The pain is strongest, about 5 or 6 in my brow and eyebrow on the right side of my head. In daytime the pain is tolerable. At night is when it is strongest. Last night I took an aspirin rather than Tylenol. It seemed to be more effective. I have learned to take the medication before the pain begins and not wait for the pain to develop. 11.02.13 took Tylenol at 6:30 pm for pain in right brow area. 11 pm took aspirin 325mg for pain on top and back of head. 11.03.13 pain has moved from right brow area to top and back of head. Didn't take any pain reliever for the 24 hours of this day. 11.04.13 12:30am pain was at level 3 on top and back of head. Took aspirin 325 mg which reduced the pain to level 1. I have been taking less pain reliever since the pain has moved to the top of my head. [This is after the pain moved from left brow area to right brow area on Oct. 27] I have taken a supplement for sinus issues. On Nov. 1, 2, and 3, I took 6 capsules of OregaMax [oil of oregano]. The oil of oregano is P73 wild oregano which federal government approved as a food item. The drops of Oil of oregano under my tongue, relieved the head pain almost as well as pain reliever. Are there other steps to be taken before the neurology consult? Where do I go for the neurology consult? Is it out of your facility? Then travel becomes an issue. Please advise me what to do. I would like to exhaust other possibilities if there are any. What is the next step? Thanks

Another reads:

I had a Angio gram on Jan. 30. The results are that I definitely have one artery that is 100% blocked. It is the same one that was found the last time I had an Angio gram, in M, and they decided to leave it as my heart had formed new arteries. At H they tried to open it and were not able to, so they are considering having me back to go in on both side, as the surgeon feels he has an 80% chance of getting a stint in. My follow up appointment is on Feb. 13 and I will get more info then.

And the following message had multiple themes: increasing symptoms of pain, difficulties dealing with life, and a theme for need for immediate medication refills. The “bold” typeface is a reflection of the patient’s entry.

So sorry to bother you but I am to the point where I need to ask you for another refill on the Hydrocodone. I have been taking just the tramadol for 6-7 months now, and it just seems to not be working so well anymore. I know you sent me a refill of the Hydrocodone last month, but I had to take all of that already. I have been having **more severe pain**, discomfort on my whole left side and really the inability to do much of anything. I am not sure if it is the weather or just the fact that I **have to raise my children by myself** and there is more and more to do for them, but I just **cant hardly do anything or even move** unless I have some stronger medication. I think I am going to need to go back on the Hydrocodone every month again like before. I hope that if I can just do the 240 tramadol and the 60 hydrocodone every month now, then I could supplement those two and **manage some sort of life**. Unfortunately, though just the tramadol is not enough anymore. So if you could **please please help and write me a script for Hydrocodone immediately**, I can come and pick it up today. I am totally out and **I am dying today. This would really really help me today**. I can come right over and get the script from you and walk it over to pharmacy and pick it up today. It has been a month since my last script for this and I am sure it could be filled. I am so sorry to ask and **I try to go without some times**. However, **I am in really really bad sorts and in miserable pain**. I know you said the tramadol is on the way and I talked to Pharmacy and they said it is coming so I will have to wait on that. Honestly though I need the stronger Hydro anyway. They said to get with you and have you write a new script for the Hydrocodone, then they could refill it now. So **J please please get back to be ASAP and let me come over to pick up a script for 60 Hydro and then we should make sure I can get the tramadol and the hydrocodone filled every month now. Please help!** Thank You for your immediate attention to this matter, it is greatly appreciated. Sincerely and Respectfully,

*Comments/ questions or Information to the provider.* These messages account for 242 (14%) of all the 1720 themes. Several (1.4%) messages thanked the provider for their help. Quite a few were wishes for various happy holidays, depending on the time of year. Conversely, some messages included threats to other providers:

I just found out I need biopsy of esophagus. Dr. G ignored this, so if I have cancer, she is in serious trouble. Dr. S is going to talk to her about some things, esp. now. When is my mammo? It's due this month. It is not sched. bec. Dr. W did not see it. Still LBP but a little better, no thanks to Dr. G.

And other patients wrote of having done something wrong and the tone was perhaps contrite or apologetic.

J, I am so sorry I was not aware that I was under some contract to not see any one else or take any other medicine. I do not have any record of a specific visit or a full prescription. I was just givin it to try as a favor and there were no formal scripts or documentation. I am sure you will be upset about that as well. However,there is nothing to send you or document this. I was just given a couple of doses as a favor and as I said there was no formal appointment or prescription. I am sure this will upset you and I am so very sorry, but I was not aware that I violated any agreement or contract. If I was aware of this I would not have even asked. Additionally, If I can not get enough to help me I would prefer to stay on the same regimine. Please forgive me and see your way clear to continue to issue my meds as in the past. I promise I will not do this again and I am now very aware of what I can and can not do. Thank You!

Or similarly, though with a great deal of anguish:

DR. M I HAD NO IDEA YOU WOULD RECEIVE THIS I AM JUST FRUSTRATED SWEARING DOESN'T GET ME ANYWHERE EXCEPT HAVING TO APOLOGIZE OVER AN OVER !...  
DR.M I RESPECT YOU OUT OF EVERYONE THERE I AM SO SORRY TO SWEAR ! BUT I'M JUST ANGRY I CUT TIES TO THE ONLY PERSON IN MY LIFE MY DAUGHTER !

Some of the messages do include the word thanks: “Thanks for ordering the EMG” and

Good morning,,I bet you miss me,I just have a question for you,in April in will turn 65,If i new I would live this long I would have taken better care of myself,,anyway say I have a problem at home and use 911 to take me to the hosptial,,Do I pay for the 911 call and the stay in the hospital,, Thanks

Very few messages contained appreciation for care the patient received. That was found in this particular message: “Thank you for all your good care”. Some patients share information with their provider such as “We’ve had a large fire” or “I had to quit school” and “Hi R, Can you please ask Dr B to get on secure messaging it does not work if they are not on it”. Other messages include the need for assistance at home, gym access, handicapped car stickers and other needs.

*Appointments.* Some of the themes comprising the topic of Appointments may be examples of patients seeking help within a large and at times, cumbersome, hospital system. Themes about appointments accounted for approximately 130 (7.6%) of the total

themes. There were seven themed requests to “squeeze in their appointment soon”.

Many themes asked the provider to make an appointment for them, for that particular clinic or other clinics, such as this message:

Good Afternoon, I am due for my annual PAP Smear, please let me know what dates you have in Jan to schedule an appt. Also, I will need another consultation with the dermatologist to schedule my next Botox procedure for my hyperhidrosis. Thank you,

Other messages were notices of appointments occurring shortly or because of an emergency, such as this:

Well, I had a bad fall today at work or should I say yesterday and I was in enough pain to admit myself to the ER. My knee gave out/buckled and I fell straight down about four steps high. I twisted my back pretty bad and injured my knee. I was given 2 days off of work and 15 Vicodin. I've already taken 3 of those and I still can't sleep. I'm hurting and need to get seen. There's no way I can go back and work 10+ hour days on my feet walking up and down hills and stairs. If you can please squeeze me in to see the doctor either today or tomorrow and able to give me more time off until I'm able to be on my feet for hours on end. It being a work injury, I need to make sure I'm good to go! Especially since I just started. Well, thank you for reading my long story! Lol.. Please call me if I can come in. I'll be up at 730 to call in and report to my supervisor and give her an update on what's going on. I'll probably go back to sleep for a few hours and go in to fill out paper work. Thank you for your time! Happy New year!!!

Messages included requests to have lab work ordered on a specific day and requests for certain lab tests. Some users wrote of questions they planned to ask at their next appointment, such as how to find long term care facilities. Other themes listed reasons why the patient did not attend a scheduled appointment. A small number were similar to this message: “sorry, I over slept and missed my Podiatry appt. Not worth the drive to have you look at my neck” and this message:

I'm so sorry I missed my appointment last week. I was taking my mother to the University of C hospital and completely forgot with everything

going on. I've rescheduled for 5 December, but I'm not 100% sure I can make”

And finally this message: “I had a appointment on 12/10 I called and cancelled”.

**Consults.** Requests for consultative services with specialists, called “consults” in the VA, numbered 109 (6.3%) of total themes in this sample. Consults, as a topic, is comprised of requests for specialists and agreements to see a specialist, along with requests specifically made for durable medical equipment (DME: walkers, thromboembolic hose, hearing aid batteries and similar equipment), which is a specific consult service, Prosthetics, in the VA. The most numerous requests for consultations were to dermatology, orthopaedics, and podiatry. “can you setn up an appointment to see a VA foot specialist? I already ordered my shoes from my outside foot Dr... Thank you” and “Yes still have shortness if breath whenn I do alot of mopving around. not as bad as it was. I still get tired. I am still requesting a cardiologist from the V.A.... appointment. Thankyou.”

Requests for prosthetics consults and problems with DME accounted for about a quarter of the themes listed under this topic of consults. “Dr. D, can you order me a knee brace for support for both knees and some black support sock. Thanks” and “I went to prosthetics to acquire the nasal prongs. they said that my primary had to put in an order before they would order the item”, “Doc. E i've been having problems sleeping and when i wakeup i have thgis pain in my neck. i would like to have one of those pillow that they have with prosthetics”.

**Need for results of tests or procedures.** Themes related to requests for the results of various tests and procedures that had been ordered and completed for the patient accounted for 97 (5.6%) of the total number of themes. Several of these were tinged with

some degree of concern, such as this message: “I am wonderin [sic] why no one is giving me any information on what is going to happen with my left eye? No follow-up?”.

Patients did seem to be in need of follow-up regarding testing, as seen in the two following examples: “I am still looking for test results for VA Chemistry/Hematology. How long does this normally take to complete” and

Hi D Can you let me know what my blood test results are? I went in on Feb 21st. You should have them, hopefully by now. I would like to know mainly the A1C because it will determine if I go to the outside doctor or go to one at the VA. Thanks, my phone number is xxxx

***Reporting of outside appointments/outside hospitalizations/emergency visits.***

There were approximately 92 (5.3%) themes that discussed treatments by other “outside”, VA and non-VA providers and admissions to other hospitals. Some of the messages were about treatments and procedures from another VA such as:

J, I went to Milwaukee today and Dr. S said the blood flow challenge should correct itself in approximately 3 months. Another vein or veins will expand to handle the blood flow back to the heart. He ruled out moving the pacemaker. He also told me to increase my Losartan to 50mg once a day. You suggested 25 mg twice a day. Which do you think would be better for me considering my medicine history.

The majority of messages or themes were about provider visits and care outside the system. An example of this is “I received my first infusion of Remicade yesterday, Nov 11, 2013, at a hospital in (town) as per an order from Dr. A”. Another message reads:

Hi--Just got home from G Hospital I went there as it was an emegergency. Had septic shock with hardly any blood presssure. ICU for 4 days ad 5 days extra. Feb 2 went in. Gave me 10 liters of fluid, dobutamine, and hydrocortisone 20 mgm daily. Received cefitraxone, vantin and amoxicillin. Have been on IV lasix for 4 days. Balancing coumadin levels will talk to XX. Infectious disease physician wants me on



Amoxicillin 875 for 10 more days. Had strept-pneumococcal infection. Can you please provide me with the following from a Dr. B and Dr. S Amoxicillin 875 mgm 1 tid for 10 days which they gave me some. another rx for Amoxicillin 875 they recommend I have at home if I ever run a fever or feel a cold is coming on and then go to the Dr. Lasix 40mgm 1 daily I have about 3 lbs to get rid of yet Potassium 20 meq while on lasix 1 daily. Thank you

***Blood glucose/blood pressure/vital signs.*** This topic included themes that mostly consisted of reports of fingerstick glucose results. These themes account for 68 or approximately 3.9% of the themes overall. There were some results of monitoring blood pressure and other vital signs, which are examples of patients' self-management techniques. One comment of a secure message included "I went on vacation and forgot my insulin and although my numbers have been great I want to ask you if it is wise to stop my insulin". Overall the messages containing blood sugar results were very difficult or nearly impossible to read and decipher. For example, one SM user documented the following:

Hi R, The following are my Blood Sugar tests in Reverse Chronological order  
 1/10/13: 9am: 147, 3am: 131, 1/9/13: 5pm: 112, 8am: 151, 1/8/13: 5pm:129,  
 7am:  
 172, 1/7/13: 6pm: 246, 10am:177, 3am: 205,  
 1/6/13: 11pm: 132, 9am: 193, 3am: 238, 1/5/13: 5pm: 252, 9am: 176, 3 am:  
 222,  
 1/4/13: 10pm: 137, 9am: 213, 1am: 127,  
 1/3/13: 5pm:157, 9am: 278, 3am: 184, 1/2/13: 6pm: 108, 10am: 164, 1/1/13:  
 5pm:  
 197, 10am: 165, 12/31/12: 5pm: 131, 9am:  
 174, 3am: 212, 12/30/12: 10pm: 134, 9am: 202, 3am: 212, 12/29/13: 8pm:  
 189,12/26/12: 6pm: 238 8am: 172,.

Another SM user providing blood glucose information failed to relate the values to the time of day:

My blood sugar readings in the morning start out high and I am taking 20 units of insulin at night. The most recent readings have been as follows: 147, 151, 172, 116, 136, 122, 140, 127, 116, 150. That's for about 2 weeks. Can I increase my insulin to 22 or 23 units?

Another patient's results are as follows:

My blood glucose numbers seem more consistent with the addition of the LANTUS, but they are high. Less spikes and lows but running between 170 and 280. 7 day AVG is 187 testing 3-4 times a day. Please advise any adjustment or forward this message to the people in Pharmacy that can adjust and monitor diabetics as I do not have them in my Secure Messaging menu yet.

***Complaints and concerns.*** This topic is comprised of themes including the listing of patient complaints and concerns about their care and complaints about the VA healthcare system. The themes containing patient complaints and concerns comprised 66 (3.8%) of the total. Some messages and themes contained within this topic reflect dissatisfaction and some are complimentary. An extreme message containing complaints about issues is from a frequent user of the SM system and follows:

got message. E WILL NEVER RET. CALL FOR f/u c GI. INCOMPETANT AND ANGERING. saw dr. D--brilliant. says need mri asap for surgery-fusion possibility---disk is ballooning out and shrinking. she calls it a fragment. says it is moving in and out so pain changes in intensity. projects in 5 yrs. will be bone on bone, for sure. I know it needs fused now. why wait 5 yrs.? she has currently seen the bones are stressed and the disk will start to shrink. can X hosp do mri since this hosp has only 1 machine and it is better to get it done for surgery preparations that i hope she will do, as well. trust her, but she has no bedside manner whatsoever. i waited 6 months perhaps for initial mri last year when evidence of radiculopathy was seen already in sept of 2012 and politely ignored. i have definately seen the VA leave me in unnecessary pain and my lawyer atty S, ltd, agrees. will not pursue VA since limited recovery. would only have done if had cancer dx, delayed by a prior primary, who is NOT you. i am glad, as an aside, that he knows there are 4 clear areas i wrote Pres. Obama and Mark Kirk about that he will f/u with a letter to support all contentions that i raised. you have done me no harm. EUREKA! WHAT A RELIEF!

Another message of another patient expressing concern contained the following:

I MISSED MY APPOINTMENT YESTERDAY I HAVE NOT HAD A CAR IN 10 DAYS I HAVE BEEN UNABLE TO ATTEND PHYSICAL THERAPY. MY ANKLE IS HURTING I THINK I RE-INJURED IT. AM I SUPPOSED TO FOLLOW UP WITH NEUROLOGY? OR ITS NO BIG THING THAT THEY FOUND SOMETHING ON MY MRI I DON'T HAVE ANY RITALIN I'M SUPPOSED TO GET THAT EVERY MONTH I RAN OUT OF PAIN MEDS BECAUSE THE COMPUTER AT MY GOV.COM WAS OFFLINE. I TOLD MY PREVIOUS DOCTOR I DON'T LIKE ABILIFY CAN I TRY A DIFFERENT MEDICATION ALL THIS IS FALLING ON DEAF EARS? MY BACK HURTS MORE WITH THIS COLD WEATHER I GUESS I'M WASTING MY TIME EVEN SENDING THIS FUCKING MESSAGE

Another was a note of dissatisfaction over loss of former treatment no longer available. The message was not angry in tone, but it was rather lengthy and conveyed unhappiness with the system change. A second theme in this message was listed under the topic of symptoms:

Here are the entries that would have been recorded by the therapists at the VA gym and pool under the old system of patient care.

Journal for December Do NOT Reply

I cannot tip my head back or look backwards when driving in reverse without pain. I will have to go to the chiropractor.

6 VA pool therapy constant tingling or numbness in both feet. Used continual hip flexor exercises to restore normal feeling in my feet.

7 VA therapy exercise class and I experienced continual dizziness and balance problems for the full half hour. After class my blood pressure was 117/84 and I had not taken any blood pressure medication this morning. My guess is that my pulse rate was too high.

10 Neck adjustment. I am now able to look behind and over both my shoulders and tip my head back to drink. About 7:15 am - 3 floaters in right eye lasting about 15 minutes.

11 VA pool therapy. Pool temperature 97 degrees. Hands and feet tingle during exercise class.

12 Neck pain varies from 4 to 8 on right and left side. Turning my head to the left increased the pain to 8. Turning my head to the right increased the pain to 6.

13 Last night I slept with a special pillow and my neck is almost as good as December 10th.

15 Neck flexibility same as December 10th except pain level 1+ and occasional stabbing pain between 4 to 6.

16 Neck very sore, right side stabbing pain 4 to 6. Used neck support.

17 Neck adjustment, pain reduced to occasional 2+ stabbing on right side.

18 VA pool therapy constant tingling or numbness in both feet and hands again. Used repeated hip flexor exercises to restore normal feeling in my feet. Avoided side stepping and side stretching exercises.

19 VA gym class without dizziness and occasional tingling in both hands.

20 VA pool therapy class only occasional tingling in both feet and hands. Avoided side stepping and side stretching exercises.

21 Neck adjustment, flexibility good, occasional stabbing pain on right side 3+

31 Neck adjustment, flexibility better, no stabbing pain on either side.

***Response to provider.*** Of the 61 (3.5%) themes that are clearly a response to a question asked by the clinician, some have only several words such as “thank you”. Some messages include emoticons, such as “Thanks, I appreciate it :=]”.

However some of the responses were more lengthy, as in the example from a patient requesting a specific medication displays and is clearly a response to a question posed by the provider in a previous component of a SM thread:

It is pure tribulus extract with other ingredients; dicalcium phosphate, microcrystalline cellulose, stearic acid, magnesium stearate, croscarmellose sodium, silicon dioxide, aqueous film coating (purified water, hydroxypropyl methylcellulose, polyethylene glycol) I thought it would be worth a try. A friend uses it and seems to work well. Let me know.

This message was also a response to a provider’s query, “Per your request, the Synthroid is 50 mcg. Merry Christmas”. There were many replies, which were clearly

relational in tone; an example of which was “Hi J, I respect your good advice. If you think it would be beneficial than I will come in for a consult”.

**Conclusion.** In summary, 1200 secure messages were reviewed. From those messages, 1720 themes were identified that captured the intent of what was being said within the messages. Those 1720 themes were then reduced to concentrate the data to provide an efficient representation of the large volume of data, as suggested by Krippendorff (2013). That reduction resulted in the identification of ten topics that represented information conveyed by the patients or their designated representative to their providers, within their secure message. Requests for medication refills, questions about medications, requests for changed dosages of current medications composed the topic entitled Medications, which was the most frequent reason for messaging. The other topics in descending order were then reviewed.

### **Question Two**

What is the relationship between SM topics discussed and the gender of the patient?

**Analysis and unitizing.** Secure messages were reviewed by gender of the patients. Of the total of 1200 messages, 1040 secure messages (86.6%) were written by men or family members or significant others of men patients. Women writers of secure messages numbered 160 or 13.3% of all messages written.

### ***Sampling, Coding, Reduction, Abductive inferring and Narration.***

Determination of which of the 1720 themes were written by gender required further analysis. Themes were divided into those written by men and those written by women. Then each group of 1471 (87%) themes written by men and 249 (14.47%)

themes attributable to women were then parsed to determine which gender wrote how many of each types of the ten topics overall. These results were then calculated to measure the part of the whole for men and women entries and displayed in Table 7. Chi square statistics were computed for each theme by topic and gender. Chi square results for three topics; medications, symptoms and blood glucose/VS results, exceeded the critical value [ $\chi^2 = 6.64, p=0.01$ ] and are presented in Table 7. No other themes were statistically associated.

Table 7

*Breakdown of Themes by Topic and Gender,  $\chi^2$  Results*

| Topic                        | Men               |  | Women            |  | $\chi^2$ diff* |
|------------------------------|-------------------|--|------------------|--|----------------|
|                              | n=1471 themes (%) |  | n=249 themes (%) |  |                |
| Medications                  | 533 (36.2%)       |  | 61 (24.4%)       |  | 12.973*        |
| Comments/Quest to prov       | 204 (13.8%)       |  | 38 (15.2%)       |  | 0.342          |
| Symptoms/Changes in Cond     | 185 (21.4%)       |  | 76 (30.5%)       |  | 53.280*        |
| Appointment                  | 110 (7.4%)        |  | 20 (8.0%)        |  | 0.094          |
| Need results of test/Proc    | 90 (6.1%)         |  | 7 (2.1%)         |  | 4.377          |
| Consults                     | 88 (5.9%)         |  | 21 (9.6%)        |  | 2.156          |
| Outside Appt/Outside Hosp    | 86 (5.8%)         |  | 6 (2.4%)         |  | 4.968          |
| Blood Glucose/VS             | 66 (4.4%)         |  | 2 (0.8%)         |  | 7.609*         |
| Reply to Prov Message        | 56 (3.8%)         |  | 5 (2.0%)         |  | 2.015          |
| Complaints/Concerns/Problems | 53 (3.6%)         |  | 13 (5.2%)        |  | 1.511          |

Note: 1 degree of freedom (df),

\*  $p=0.01$

Cross-tabs were calculated for these three topics and are displayed in Table 8.

Table 8

*SM Topics; Meds, Symptoms, and Blood Glucose/VS Cross-Tabulation*

| <u>Topic</u>                         | <u>Gender</u> |                        | <u>Yes</u> | <u>No</u> | <u>Total</u> |
|--------------------------------------|---------------|------------------------|------------|-----------|--------------|
| Medications                          | Men           | Count                  | 533        | 938       | 1471         |
|                                      |               | % within gender        | 36.2       | 63.7      | 100          |
|                                      |               | % within meds          | 89.7       | 83.3      | 85.5         |
|                                      |               | % of total             | 31.0       | 54.5      | 85.5         |
|                                      | Women         | Count                  | 61         | 188       | 249          |
|                                      |               | % within gender        | 24.4       | 75.5      | 100          |
|                                      |               | % within meds          | 10.2       | 16.9      | 14.4         |
|                                      |               | % of total             | 3.5        | 10.9      | 14.4         |
|                                      | Total         | Count                  | 594        | 1126      | 1720         |
|                                      |               | % within gender        | 34.5       | 65.4      | 100          |
|                                      |               | % within meds          | 100        | 100       | 100          |
|                                      |               | % of total             | 34.5       | 65.4      | 100          |
| Symptoms/<br>Changes in<br>Condition | Men           | Count                  | 185        | 1286      | 1471         |
|                                      |               | % within gender        | 21.4       | 87.4      | 100          |
|                                      |               | % within symptoms      | 70.8       | 88.1      | 85.5         |
|                                      |               | % of total             | 10.7       | 74.7      | 85.5         |
|                                      | Women         | Count                  | 76         | 173       | 249          |
|                                      |               | % within gender        | 30.5       | 74.4      | 100          |
|                                      |               | % within symptoms      | 29.1       | 11.8      | 14.4         |
|                                      |               | % of total             | 4.4        | 10.0      | 14.4         |
|                                      | Total         | Count                  | 261        | 1459      | 1720         |
|                                      |               | % within gender        | 15.1       | 84.8      | 100          |
|                                      |               | % within symptoms      | 100        | 100       | 100          |
|                                      |               | % of total             | 15.1       | 84.8      | 100          |
| Blood<br>Glucose/VS                  | Men           | Count                  | 66         | 1405      | 1471         |
|                                      |               | % within gender        | 4.4        | 95.5      | 100          |
|                                      |               | % within blood gluc/vs | 97.0       | 85.0      | 85.5         |
|                                      |               | % of total             | 3.8        | 81.6      | 85.5         |
|                                      | Women         | Count                  | 2          | 247       | 249          |
|                                      |               | % within gender        | 0.8        | 99.1      | 100          |
|                                      |               | % within blood gluc/vs | 2.9        | 14.9      | 14.4         |
|                                      |               | % of total             | 0.1        | 14.3      | 14.4         |
|                                      | Total         | Count                  | 68         | 1652      | 1720         |
|                                      |               | % within gender        | 3.9        | 96.0      | 100          |
|                                      |               | % within blood gluc/vs | 100        | 100       | 100          |
|                                      |               | % of total             | 3.9        | 96.0      | 100          |

Men constituted the majority of veterans in the sample. Men followed and reviewed their blood glucose and vital sign monitoring significantly more than women

did; women accounting for less than 1% of the entries under this topic, and all of these were related to review of blood pressure results. An example written by a man was:

Sorry it took so long to get in touch, these are my blood pressure reading after I start taking Valsartan 80MG TAB. two in the morning and one at night. 12/17/12 was 111 over 76, 12/18/12 115 over 78 12/19/12 109 over 76 12/20/12 119 over 80 12/21/12 123 over 78 12/22/12 127 over 81 12/23/12 126 over 80 12/24/12 124 over 80. Today 01/10/13 was 119 over 76. I change my diet and ride my exercise bike every other day.

Women wrote more messages related to symptoms such as:

Not feeling well since Saturday, currently at work, but going home shortly. My pain in in my neck, shin(left), lower back and hip (left). Since this morning I have taken meloxicam (2) and acetaminophen 325 (1) no relief. Want to come in for a shot, but no appointment. Can I come into ER and get one or do I have to make an appointment with doctor?? Also need another consult for back doctor. I can be reached at xxxxx in about 45min from now 1305

And another woman wrote:

ok the xray does not sound like what we need. can you put me in for creams and anti inflammatory. but 800 mg morphine is not working. I wanted to ask about my acid reflux I was told this from navy and 800 mg of morphine. Is this true? and what about arthritis but I was over weight when I got out. if I can put in i will but I know that I would need a dr to back me up. thanks for everything.

These messages regarding symptoms written by women do not vary much by substance as compared to men, simply that there were 50% more written by women than by men.

**Conclusion.** Women made up 13.37% of total messages in this sample, men the remaining 86.6%. But messages written by women contained more themes than did messages written by me. The topics of requests for appointments, complaints about the VA system, replies to providers' questions and questions to providers, resulted in similar

percentage of responses by women and men. Although requests for consults were nearly evenly sought, a subset of consults included requests for durable medical equipment. Only men wrote messages in relation to orders for durable medical equipment, and they asked for aids, scooters, blood pressure monitors, or other equipment. Women documented symptoms significantly more than men. Men were the only ones to document blood sugar results, though women twice reported blood pressure results. A significantly greater percentage of men requested medications through SM, as well as requesting results of test or procedures. Conveying the results of appointments with providers outside the VA and discussion of hospitalizations outside the VA occurred more frequently with men than with women.

### **Question Three**

What is the relationship between SM topics discussed and age of the patient?

*Analysis and unitizing.* Within this sample, the youngest user of SM was age 27 and the oldest was age 92. The breakdown by numbers of participants based on their ages is denoted in Table 9. The greatest use of SM within this sample occurred in the age range of those 55 to 64 years. The next greatest use of SM was demonstrated by those in the 65 to 74 age range, and was nearly identical to the 55 to 64 year olds by frequency. Following those two age ranges were the 45 to 54 year olds, followed by 75 to 84 year olds. The least frequent use was by the following age ranges in decreasing order: those 35 to 44 years, 25 years to 34 years, and finally those greater than 85 years of age. A bar graph of these age ranges, including the numbers within each category is seen in Figure 2.

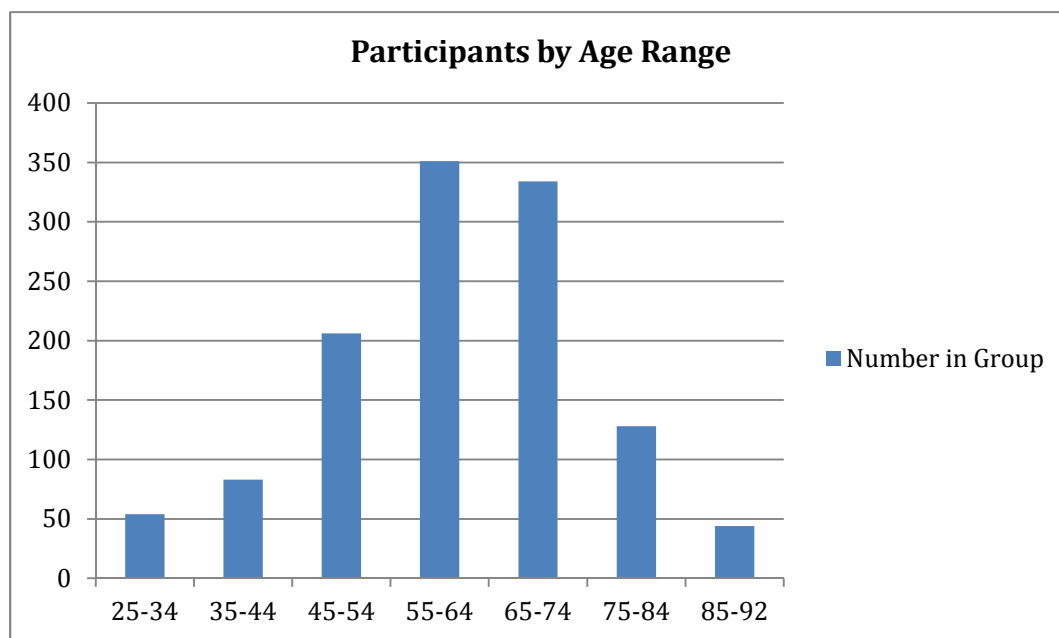


Table 9

*Secure Messages by Age Ranges and Topic Addressed*

| <u>Age Range</u> | <u># in group (%)</u> | <u>Top Topic</u> | <u>Second Most Freq Addressed Topic</u>                            |
|------------------|-----------------------|------------------|--|
| 25-34            | 54 (4.5%)             | Medications      | Symptoms/Changes in Condition                                      |
| 35-44            | 83 (6.9%)             | Medications      | Comments/Questions or Info to Provider                             |
| 45-54            | 206 (17.1%)           | Medications      | Symptoms/Changes in Condition                                      |
| 55-64            | 351 (29.2%)           | Medications      | Comments/Questions or Info to Provider                             |
| 65-74            | 334 (27.8%)           | Medications      | Comments/Questions or Info to Provider                             |
| 75-84            | 128 (10.6%)           | Medications      | Comments/Questions or Info to Provider                             |
| 85-94            | 44 (3.6%)             | Medications      | Reports of Outside Appointments/Outside Hospitalizations/ED Visits |

Figure 2.

*Use of SM by 10 year age increments*

***Sampling, Coding, Reduction, Abductive inferring and Narration.*** In this question the narration was the explanation of what was found in the review of SM by age. Findings for each age category follow.

*25 to 34 year old group.* Within this group there were 83 message themes. The greatest number of these fell under the topic related to Medications. The majority of the themes were requests for refills, but additional themes included suggestions to increase the number of pills dispensed and the need to increase pain medication. The next most populated topic was the listing of symptoms or changes in condition. These include updates on symptoms and complaints ranging from sore throats to rashes. Other symptoms included complaints of chest pain, yeast infections, rashes and pain. There were some requests for appointments, labwork and consultant requests. There were no reports of blood glucose monitoring or vital sign results.

*35 to 44 year old group.* The 35 to 44 year old grouping comprised an only slightly larger sized membership than the younger (25 to 34 year old) group just mentioned. This group's most frequent topic was also related to medications: requests for refills, the majority of requests for narcotics or pain relief medications. The next two next most frequently covered topics were comments or questions to their providers and questions regarding appointments. Of interest in this group of messages was the fact that no one wrote about any blood sugar/vital sign results, there was only one theme of concern, one request for a consultation, and not a single item in relation to complaints about the VA. Though the number of persons comprising this group was slightly greater than the 25 to 34 year old group, the younger group had 21 message themes related to

symptoms whereas this group of 35 to 44 year olds had only 3 messages regarding symptoms.

*45 to 54 year old group.* Greater in number than the previous two age groups, the 45 to 54 year olds had the most message themes related to medications, mainly requests for refills and the majority of refills were related to Schedule II narcotics, benzodiazepines, opiates, and analgesics. The second largest topic grouping for this group was the topic of symptoms. The symptoms ranged from those of urinary tract infections to pain to worsening symptoms, chest pain and anxiety. More than 78% of the symptoms listed were for negative or declining symptomatology. It is interesting to note that within this grouping were 14 requests for test or procedure results. This group had an increased number of requests for consultations with specialists.

*55 to 64 year old group.* The largest group of patients using SM was the 55 to 64 year olds. This group was larger in size than the previous three groups combined. The overwhelming request in this group of individuals was their need for medications. Over a third of all requests in this group were for medications: refills and increased dosages. Again, over a third of the requests were for Schedule II narcotics, benzodiazepines, opiates, and analgesics. This group also noted that they lost medications, medications were lost or stolen from their mail or that medications did not arrive in the mail.

Symptoms in the 55-64 year group were mostly negative at 73%, though some were reports of improved symptoms or conditions. A quarter of the comments to the provider contained positive messages of improvements in conditions. This age group had more reports of blood glucose testing along with more self-monitoring of vital signs. There were also increased numbers of complaints, frustrations, and some who voiced

anger at the particular VA or overall VHA. Threats to providers were made, “I am not here to threaten you or scare you but...”, another reads “Dr X ignored this, so if I have cancer, they are in serious trouble”.

People in this 55-64 year group also wrote messages about their appointments, requested that additional labwork be drawn, clarified dates and times, and cancelled appointments through SM. Perhaps because of the age of this group, this was the first age group to make comments about what is referred to as durable medical equipment. This topic of medical equipment was not addressed in those less than 55 years of age. These requests were for occupational therapy items, assistive aids and other products. There were, as in other age ranges described, requests for results of procedures and tests. There were a significant number of requests for appointments with specialists and more reports of outside hospitalizations, trips to emergency departments, and surgical procedures done elsewhere.

*65 to 74 year old group.* The second largest group of patients was comprised of 65 to 74 year olds. There were increased self-monitoring activities in the area of blood glucose and vital sign reports than in younger groups. Consult requests were on par with the 54 to 65 year old group. Message themes regarding medications were numerous, again with requests for schedule 2 narcotics, benzodiazepines, opiates and analgesics but at a rate of nearly half that of the younger group aged 55 to 64. There were nearly the same number of requests for results of tests and procedures, but based on size of the group approximately the same number of messages regarding symptoms. Yet only about half of the symptom reports were for worsening symptoms—versus two-thirds of symptoms cited as being worse by the younger group of 55 to 64 year olds. Though a

somewhat smaller group, reports of usage of outside VHA providers or facilities was approximately the same as the younger group. The number of complaints or personal concerns was equal to those of the 44 to 55 year olds and included worries over cardiac health, worry about the spouse's health, as well as concern over costs and insurance issues.

*75 to 84 year old group.* The 75 to 84 year olds were a smaller group than the 45-54 year olds, but surprisingly as large a group as the 25 to 44 year olds—a combination of users of *two* younger-aged groups combined, to make up a group of users in their 70s and 80s. This group overwhelmingly requested medication in their use of SM. A quarter of the medication-related requests were for schedule 2 narcotics, benzodiazepines, opiates and analgesics. There were several reports of blood glucose results and vital signs. There were a surprisingly smaller number of requests for durable medical equipment in this age group where there might be an increased need. Requests for consultants or specialists also dropped off. Reports of symptoms were less overall, and half were of worsening symptoms. There were, for the size of the group, a significant number of commentaries to their providers. The comments varied from thanks for care and happy holiday wishes to requests for information on long term care and assistive living facilities to requests for assistance at home, help at home, requests for appliances, and food. There was a smaller list of complaints and concerns regarding the VA in this group.

*85 to 92 year old group.* The 85 to 92 year old group was nearly equivalent in size to the 25-34 year old group. Their number of complaints and concerns were nearly similar-older to younger group-as were their requests for consultations with specialists. The older group monitors blood glucose and vital signs, unlike the younger group and

reported those results to their providers. There were fewer requests for schedule 2 narcotics and benzodiazepines than requested by those in younger age groups. Symptoms were nearly all worse. This group continued to see providers in the private sector. There were more requests for explanations to providers, a degree of quarrelsomeness with providers (“I had an obstruction in my small bowel. They tell me not to eat fiber but I think that is bad advise”), and a small number of complaints with the VA system and charges.

**Conclusion.** Age was not a determinant of use of a SM system. The greatest number of users of the system were those aged 55 to 74 years. Unlike their younger counterparts, the 45-54 year olds have symptomatology as their second most frequent topic written of, and symptoms continue as an frequently used topic in all remaining age groups. Requests for medications was the most frequently repeated topic for all age groups. The second most addressed topic varied slightly between the topics “symptoms and/or changes in condition” and “comments or questions or information sent to provider”. Only in the age group greater than age 84 does the second topic of discussion vary, becoming “report of outside appointments”.

#### **Question Four**

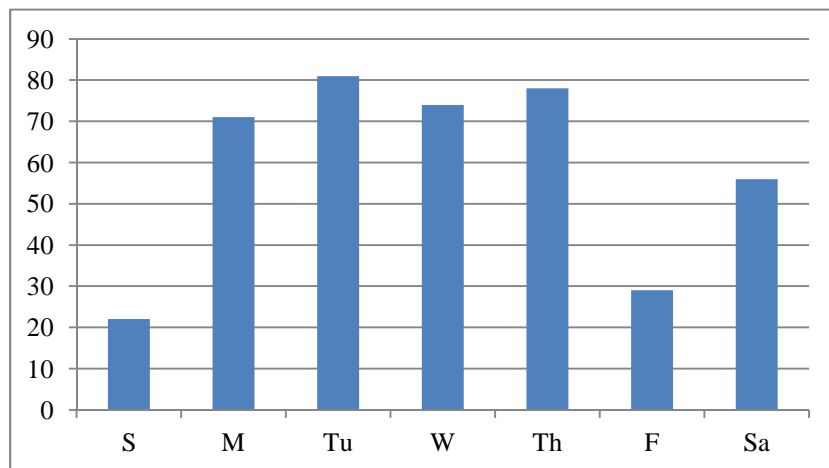
What were the patterns of use of SM by patients and caregivers?

**Analysis.** Research questions Four, Five and Six were related to the pattern of use of SM. As noted in the definitions section of Chapter 1, pattern of use was operationalized as the frequency or the occurrence of use of SM by the user. In the definition it was noted that pattern of use investigated the repeated behavior of use of SM every Monday morning or during the early hours of the day.

In Chapter 3, description of why and how the subset for this and the following two questions was presented. Briefly, the subset studied was comprised of 600 messages taken from the sample. Each of those records was opened to determine the date, day of week and time of day that each message was written by the patient. The gender and ages of the patients were noted for each record. These records were reviewed to determine how patients used SM by date and time. Figure 3 depicts how patients utilized SM by day of week. Increased numbers of notes were written on Tuesdays and Thursdays than on other days of the week. Fridays were the days of week when the fewest notes were written and similarly very few messages were written on Sundays.

Figure 3

*Use of SM by Day of Week for Patients and Caregivers*



The times of day during which secure messages were written were also considered in determining pattern of use. There were only 6% of messages written later at night; 36 messages were written from 9 p.m. until midnight. Overall, few messages were written very early in the morning; for example 15 messages or 2.5% of all messages were written between midnight and 6 a.m. The number of messages written during three hour increments during the day is presented in Table 12.

Table 10

*Secure Messages Written During Daily Three-Hour Intervals (n=600)*

| <u>Time of day</u> | <u>Number of messages (%)</u> |
|--------------------|-------------------------------|
| Midnight – 0259    | 9 (1.5%)                      |
| 0300-0559          | 6 (1.0%)                      |
| 0600-0859          | 82 (13.6%)                    |
| 0900-1159          | 165 (27.5%)                   |
| 12noon-1459        | 150 (25.0%)                   |
| 1500-1720          | 106 (17.6%)                   |
| 1800-1959          | 46 (7.6%)                     |
| 2000-2359          | 36 (6.0%)                     |
| Total              | 600                           |

Although the intent of this research question did not include the premise of content of secure messages at various times of day, it was noted that there were two messages *in extremis* written either very early in the day. Those messages read:

0251 also, may need a break from PT. i fall asleep almost while driving on pain meds. very bad. no one can take me there. 0307 by the way, with these shots, i would be able to walk around and carry things again? is that going to shrink the disk and put it back? Dr. X said definite on surgery. so he changed his mind? i have a uti, so that caused so much pain i took 4 vicodin?

0427 EMERGENY.....I am coming in early this morning....for blood and urine tests.....BUT I NEED THE UTI MEDS..ASAP!!!! I started feeling it coming on Friday but nothing happened until Sun night.....then Monday okay.....but this morning terrible. HELP. And I even drank cranberry juice yesterday.PLEASE PUT IN FOR URINE TESTS AND MEDS!!!!

Most messages were simply messages that most people would write in a commentary to their provider in throughout the day. An example is seen here:



I did come in to see X this week on Weds and he was able to fix the problem with my right ear mold but not the left Naida -- hence have booked an appt. with you but the earliest in preferred early am was in December. I have since called back to request I put on your call list when there are cancellations so hopefully will be able to see you within the next couple of weeks. As before there is no emergency but just a problem that needs to be addressed. Thanks

**Conclusion.** A total of 600 messages were reviewed for any patterning that might be observed in their construction. The greatest numbers of messages written during the course of the week were written from 9 a.m. until 3 p.m. on Tuesdays or Thursdays.

### Question Five

What are the patterns of use of SM as differentiated by patient gender?

To answer this question all SM dates, day of week, time of day and gender were copied to two MS Excel workbooks. One file included only the men; the other worksheet was comprised of women. Of the 600 messages retrieved, 522 (87%) records belonged to men and 78 (13%) were records of women. Each group was reviewed for entries made by day of week and time of day.

Starting with Question Four, a review of all 600 messages in the sample subset demonstrated that the majority of secure messages were written on Tuesdays, Wednesdays, and Thursdays. Question Five reviewed this issue of pattern of use by gender. The following trends differed, as seen in Table 11. Messages by men were written most frequently on Mondays, Tuesdays, and Wednesdays. Messages were written most frequently by women on Tuesdays and Fridays. Chi square statistics were computed for day of week and are presented in Table 11. Chi square results for Wednesdays exceeded the critical value [ $\chi^2 = 3.84, p=0.05$ ] and. No other dates were statistically associated.

Table 11

*Secure Messages Written by Day of Week, by Gender,  $\chi^2$  Results*

| <u>Day of Week</u> | <u>Men (%)</u> | <u>Women (%)</u> | <u><math>\chi^2</math> diff*</u> |
|--------------------|----------------|------------------|----------------------------------|
| Sunday             | 39 (7.4%)      | 7 (9%)           | 0.217                            |
| Monday             | 96 (18%)       | 12 (15%)         | 0.415                            |
| Tuesday            | 96 (18%)       | 17 (21%)         | 0.514                            |
| Wednesday          | 89 (17%)       | 6 (7%)           | 4.459*                           |
| Thursday           | 75 (14%)       | 12 (15%)         | 0.057                            |
| Friday             | 86 (16%)       | 18 (23%)         | 2.064                            |
| Saturday           | 41 (8%)        | 6 (7%)           | 0.002                            |
| Totals             | 522            | 78               |                                  |

Note: 1 degree of freedom (df),

\*  $p=0.05$

Similar to Question Four which looked at the overall pattern of use of SM and in particular at this point, looked at use of messaging throughout the course of 24-hours, the sample was then reviewed for use during three-hour time frames during the day by gender. The overall review of time of day for all messages written resulted in the highest use of messages written from 0900 until 12 noon. In Table 12 the times of day were broken into three-hour intervals to demonstrate as clearly as possible which time frames were utilized most frequently by men and women to write their secure messages. Men and women both wrote the most messages (>50%) during the hours of 9 a.m. and 3 p.m. Chi square statistics were computed for the time of day in the respective three hour intervals. Chi square results for 3 a.m. to 6 a.m. exceeded the critical value [ $\chi^2 = 6.64$ ,  $p=0.01$ ] and are presented in Table 12. No other times were statistically associated.

Table 12

*Messages Written During Daily, Three-Hour Intervals, by Gender,  $\chi^2$ -Results*

| <u>Time of Day</u> | <u>Number of Messages</u> |                           | <u><math>\chi^2</math>diff*</u> |
|--------------------|---------------------------|---------------------------|---------------------------------|
|                    | <u>Men (% of total)</u>   | <u>Women (% of total)</u> |                                 |
| 0001 – 0300        | 8 (1.5%)                  | 1 (1.2%)                  | 0.029                           |
| 0301 – 0600        | 5 (0.9%)                  | 1 (1.2%)                  | 12.309*                         |
| 0601 – 0900        | 69 (13.2%)                | 13 (16.6%)                | 0.684                           |
| 0901 – 1200        | 145 (27.7%)               | 20 (25.6%)                | 0.155                           |
| 1201 – 1500        | 128 (24.5%)               | 21 (26.9%)                | 0.210                           |
| 1501 – 1800        | 113 (21.6%)               | 8 (10.2%)                 | 5.469                           |
| 1801 – 2100        | 43 (8.2%)                 | 7 (8.9%)                  | 0.048                           |
| 2101 - 2400        | 11 (2.1%)                 | 3 (3.8%)                  | 0.900                           |
| Total              | 522 (87%)                 | 78 (13%)                  |                                 |

Note: 1 degree of freedom (df),

\*  $p=0.01$

**Conclusion.** Men wrote more messages on Monday, Tuesday, and Wednesday and from 9 a.m. until 3 p.m. Women wrote the most messages on Friday. Women also wrote the most messages during the same time period as men, that is, 9 a.m. until 3 p.m. .

### Question Six

What are the patterns of use of SM as differentiated by patient age?

The ages of writers within this subset of 600 secure messages was 27 to 92 years. The ages of all within this subset of 600 of all secure messages are shown in Table 13. To determine the most frequently used time frames that secure messages were written by age range required sorting by the times they entered messages. The first step required

sorting the whole list of 600 users and their messages by age range into ten-year increments. The ten year increments were divided as follows: 25 to 34 years, 35 to 44 years, 45 to 54 years, 55 to 64 years, 65 to 74 years, 75 to 84 years and 85 to 94 years.

Table 13

*Ages of SM Users in Pattern of Use Subset*

| Age     | Number of Users in Range (%) |         |
|---------|------------------------------|---------|
| 25 – 34 | 24                           | (4%)    |
| 35 - 44 | 37                           | (6%)    |
| 45 - 54 | 115                          | (19%)   |
| 55 – 64 | 165                          | (27.5%) |
| 65 – 74 | 172                          | (28.6%) |
| 75 – 84 | 68                           | (11.3%) |
| 85 – 94 | 19                           | (3%)    |
| Total   | 600                          |         |

The mean, median, and the mode were displayed for easier reading in Table 14.

The age range is representative of the overall study sample--the median is only off by 1.5 years. The mean and mode are nearly identical in this subset when compared to the sample of 1200, with the mean of the entire sample being 61.14 years and mode of entire sample being the same at 66 years of age.

Table 14

*Age range in Years, Mean, Median, Mode Ages of Pattern of Use (POU) Sample*

|                     | Total <i>n</i> | Age Range | Mean  | Median | Mode | # Messages written by another |
|---------------------|----------------|-----------|-------|--------|------|-------------------------------|
| Total in POU Sample | 600            | 27 - 92   | 61.06 | 61.5   | 66   | 31                            |

These notes were written in each of the specific months, July 2012, January 2013, February 2013, April 2013, and December 2013. Within this subset of 600 messages, the time that notes were written ranged from 0001, that is, one minute after midnight and

written by an 81 year old, until 23:47 (11:47 p.m.) written by a 63 year old. A review of these data revealed the following information.

The time of day that messages were written was analyzed. The use of SM by age range and time of day is presented in Table 15.

Table 15

*Secure Messages by Age Range and Time of Day*

| Age Range | Midnight to 2:59 a.m. | 3 a.m. to 5:59 a.m. | 6 a.m. to 8:59 a.m. | 9 a.m. to 11:59 a.m. | Noon to 2:59 p.m. | 3 p.m. to 5:59 p.m. | 6 p.m. to 8:59 p.m. | 9 p.m. to 11:59 p.m. |
|-----------|-----------------------|---------------------|---------------------|----------------------|-------------------|---------------------|---------------------|----------------------|
| 25-34     | --                    | --                  | 4                   | 7                    | 4                 | 6                   | 2                   | 1                    |
| 35-44     | --                    | --                  | 10                  | 9                    | 7                 | 7                   | 0                   | 4                    |
| 45-54     | 5                     | --                  | 13                  | 23                   | 38                | 22                  | 9                   | 5                    |
| 55-64     | 2                     | 4                   | 20                  | 43                   | 34                | 33                  | 15                  | 14                   |
| 65-74     | --                    | 2                   | 26                  | 59                   | 45                | 20                  | 14                  | 6                    |
| 75-84     | 2                     | --                  | 6                   | 19                   | 15                | 17                  | 4                   | 5                    |
| 85-94     | --                    | --                  | 3                   | 5                    | 7                 | 1                   | 2                   | 1                    |

The busiest time of day for SM is 9 a.m. until 6 p.m. numbering 418 and resulting in nearly 70% of all messages written. Few secure messages are written between midnight and 6 a.m., only numbering 15 and constituting only 2.5% of the sample. The groups with larger numbers of secure message writers were those within the 65 to 74 year old group and the 55 to 64 year old group, writing 172 and 165 messages respectively and both these groups wrote messages later into the evening, than did other age groups.

Finally, also investigated was the day of the week during which secure messages were written. When individual age ranges were reviewed, 25 to 34 year olds wrote 50% or 12 of the messages in this sample on Tuesdays with no messages written on Sundays. In the 35 to 44 year old range, nearly 30% were written on Mondays and 23% on Tuesdays. In the 45 to 54 year old range, the majority of messages were written on Mondays and Fridays. Fifty-five to 64 year olds wrote messages in the sample predominately on Fridays with a nearly even distribution of the remaining notes on Monday through Thursday.

In the 65 to 74 age range Mondays, Wednesdays, and Fridays were the days utilized most frequently to message, with Tuesdays and Thursdays totaling about five messages behind. The 75 to 84 range was fairly evenly distributed Monday through Thursday. In the 85 to 94 year old range, nearly one third of messages were written on Mondays and only three messages of the total 19 messages written on the weekends .

**Conclusion.** In conclusion, the youngest and oldest age ranges wrote notes predominately on Mondays and Tuesdays. In this sample, the greatest numbers of notes were written by those in the 65 to 74 year age range and the second highest age range was the 55 to 64 year olds. Combined, those two groups accounted for more than 56% of the secure messages in this sample. Those SM users wrote their notes most frequently on Mondays, Tuesdays, Wednesdays, and Thursdays. Weekends only accounted for 15% of all secure messages written and included those in all age ranges.

## Summary of Results

The results of data analysis were presented in this chapter. Participants in this review included patients utilizing a SM program at a health care center in the Midwest. Detailed answers to each of the six research questions were provided.

The age range of those writing secure messages was 27 to 92 years of age. In the first three questions the study reviewed 1200 secure messages written by patients. Each message was thoroughly reviewed to determine what it was that the veteran was actually writing about. The contextual information within the message was considered the theme. Messages contained as many as four themes. Themes totaled 1720. These themes were then reduced to ten topics which captured the essence of the themes, using Krippendorff's methods for content analysis.

Research Questions Four, Five, and Six required a different method of analysis. Half of the total number of messages were reviewed to capture the time the note was written, the day of week, the gender, and age of the veteran. These 600 messages were reviewed not for content but rather what the pattern of use of the messaging system would depict, to describe the manner in which veterans use the SM system.

Findings were presented by research question. Conclusions for each research question were presented. As demonstrated by this study, the SM system was utilized most frequently as a mechanism to refill medications. Within the topic of medications however, veterans also asked logical questions regarding the medications taken and questioned the providers of other cogent issues related to their health. The next most populated topic was a listing of the veterans' symptoms or changes in condition. Under

these topics and those such as blood glucose monitoring results and in comments to providers, strong and logical discussions were noted related to self-management skills.

Numerous messages were expressions of self-management skills. Whether an individual was reporting fasting blood glucose, monitoring a skin rash, or questioning the next step in their treatment plan, the premise of all these were reflections of self-management skills. It was heartening to see the VA continue to support and encourage the use of SM, and ultimately self-management.

### **Chapter Summary**

A study of 1200 secure messages was undertaken at a healthcare facility in the Midwest. The ages of veterans writing secure messages ranged from 27 years to 92 years of age. The mean age was just over 61 years. Men accounted for 87% of the study participants, while women wrote 13% of those messages reviewed. Family members or friends wrote 77 messages for the veterans. For Questions Four, Five and Six, a subset of the original sample was devised to better review pattern of use in secure messages.

Findings were displayed for each research question. Examples of individual secure messages were reviewed. Conclusions for each research question were presented.



## **Chapter 5**

### **Introduction**

Secure messaging (SM) is an additional technology that is being utilized within healthcare to assist in providing patient-centered care. Secure messaging allows patients to communicate with their providers over a secure network. The purpose of this study was to describe the themes discussed using SM, the pattern of use of SM, and whether the themes discussed and/or the pattern of use varied based on gender and age of the secure message user. Patients and in 77 cases, caregivers, wrote 1200 messages that were reviewed for this research. From those messages, 1720 themes were extracted. Utilizing techniques supported by Krippendorff, each of the 1720 themes was sorted into one of ten overall topics that best described what the patient was expressing in the message. The pattern of use was determined by an extensive review of 600 messages, where time of day, and day of week, gender and age was used to further describe the use of the system.

Content analysis was utilized to examine and parse the messages, themes, and topics that were reviewed. An explanation of content analysis accompanied each question where it was used. Other questions were examined using descriptive statistics. In this chapter the findings are discussed within the context of theory, implications for practice, nursing informatics, and policy development are identified and discussed.

### **Discussion**

Secure messaging has made an impact on patient care and is exemplary of patient-centered care not only because the patients are the focus of the interaction (Brennan, Downs & Casper, 2010; IOM, 2001; Rogers, 1951) but also that patients occupy a role using technology as a driver of the relationship. In this study, ten topics were deduced

through reduction of 1200 messages and 1720 themes. Moreover, secure messages frequently contained more than one theme per message in several instances. Some messages also conveyed underlying issues and emotions required judicious reading to discern the fine points.

In this study, medication-related content was the topic that accounted for nearly a third of all SM themes, and most of the themes under this topic were requests for refills of medications. However, there were also some patient discussions related to medications they wanted to take or were currently taking. These findings are similar to those obtained by Sitting (3003) more than a decade ago. In that study unencrypted email between patients and physicians was reviewed. Twenty six percent of the email messages were about medications and treatments, 22% were about symptoms and 20% of the email messages requested action about the patients' specific medications such as requiring refills.

Moreover, in this study, the requests for medications were for stronger, higher dosages, and refills sooner than should be allowed. This was not reported in any previous research studies. It also appeared to be non-discriminatory; the issue pervaded the youngest users of the system, those in their 20s, through the 90 year olds.

What has not been reported in the literature is gender differences in secure message use in regards to medications. The only area where requests or comments or a refill for medications was *not* the overwhelming request in secure messages was found in the women studied here. Medications were the *second* most frequent topic written about by women, bested only by the topic Symptoms. Reasons for this were not discussed in

the secure messages themselves. It is possible that women read the instructions to refill medications in other manners or in the appropriate areas of the Website.

Refilling of prescriptions was done using the secure messaging system despite patients' access to a specific area on the MyHealthVet (MHV) Website that was designed to refill medications. Additionally, veterans have the option to use the medication refill system using a telephone, as non-veterans would do at a local drug store. Patients also have the ability to refill medications by dropping a postcard in the mail, which results in a refill automatically being sent to the patient. Patients may also show up in person and waiting in line for a refill at the pharmacy. There could be several reasons for their use of SM to refill medications. SM users may find that SM is much easier to access than the other systems available with the VA. Perhaps some of the patients have impaired hearing and refilling through a telephone line is not easy for them to use. Possibly patients use SM for medication refills because of the impersonal quality of it and thus there is no judgment or questions imposed upon them when refilling narcotics and other medications. Yet, this discussion of medications with providers in a secure message is an indicator of self-management. The patients can access the MyHealthVet system, move over to the SM component of the Website, and carry on a conversation of sorts with their clinical staff members; asking questions, making suggestions for different types of medications, while not receiving judgments. It can all be accomplished in a more personal way and at their leisure.

After medications, the next most frequent topic within secure messages was that of Symptoms and/or Changes in Condition. While the percent of topics related to symptoms is less than noted in Sittig (2003) or by White, Moyer, Stern and Katz (2004),

it remained as the second highest category in this study. Certainly, when a person does not feel well or has non-emergent changes in their physical or mental health is it convenient to be able to sit and immediately write to the person who cares for your health—and this may be done day or night. With SM, patients no longer need to search their provider out, wait on the phone, or be told to call back at a later time. Moreover, the speed of a healthcare provider's response could influence use of SM. Secure messaging is convenient and though warned to not use SM in the case of an emergency, some healthcare providers appear to have a quick turnaround time when responding to their patients' secure messages.

Utilization of the Individual and Family Self-Management Theory (IFSMT) (Ryan and Sawin, 2009) as a foundation for this study was the appropriate theory to relate the use of secure messaging to self-management techniques by patients. Behaviors such as messages relating blood glucose monitoring, vital signs, requests for assistance to quit smoking, weight-loss, even medication changes are clearly reflections of self-management behaviors. In the dimension of context, the patients were able to access and utilize SM through the internet. This was true of people in all age ranges and of either gender. In the process dimension of IFSMT, the desire to utilize technology to self-monitor was also borne out; patients utilize SM throughout the day, morning, noon, and night, and Sunday through Saturday.

In this study, the third most frequent topic was questions, comments or information sent to the provider. Medications, symptoms or changes in their health condition along with these questions or comments for their provider are all indicators of self-management skills. In the IFSMT, Ryan and Sawin (2009) define self-management

as the tasks individuals undertake to live with one or more chronic conditions. The IFSMT was utilized with the premise that the use of SM is reflective of the incorporation of health-related behaviors into one's daily routines. In this study, review of messaging times utilized throughout the day and review of usage by day of week were determined to be important factors to be considered as indicators of operationalizing SM into daily routines.

Despite the fact that the greatest number of themes clustered under a single topic had to do with medications, these requests for medications are also indicative of self-management. More requests than would be expected perhaps were for Schedule II narcotics, benzodiazepines, opiates, and analgesics. Most messages were pleasant in tone. The other messages were the routine questions of patients needing to be assured that their health was alright. There seemed to be a need for interaction with a clinical person who knew them personally and who cared. The patients displayed the need for increased information and to question the next steps in their treatment, requested help with paperwork, requested assistance to complete or fax a form, and questioned their diagnoses. This use of SM contained an interesting mix of questions and concerns and was clearly indicative of self-management. As knowledge and belief factors in the IFSMT support self-monitoring and self-efficacy, SM is another tool which enables veterans in this study to strengthen their role in self-care.

Reviewing themes and topics of SM by gender revealed that in this sample, men performed better than women in regards to vital sign monitoring and glucose monitoring. Whether due to the fact that few of the women in this review had diabetes or hypertension or that women generally do not monitor, was not reviewed for this study.

While women comprised just over 13% of the sample, they had 23% of complaints or concerns, and requested 22% of the consultations with specialists. Women wrote more than a quarter of all of the total number of messages related to symptoms or changes in condition.

Men composed 86.7% of the messages but wrote 50% more requests for medications than women and requested twice the number of themes related to test results than women did. Men also requested or reported 50% more on outside appointments with other specialists or on outside hospitalizations. Interestingly, Cohen and Stussman (2010) found otherwise: they found that women were more likely than men to refill a prescription and make an appointment online, using the Internet. In this study, men were the only ones to ask for durable medical equipment. Men also had twice the frequency of replying to provider messages than women did.

Women made up 13.37% of total messages in this sample, but accounted for approximately one quarter of the entire hospital enrollment. There was no true outcome to account for this, other than to hypothesize that more women were either currently active duty members or recently left active duty, members both of whom would potentially continue to utilize providers on the active duty side of the hospital, which does not utilize MHV or this SM program. The Department of Defense utilizes the military's version of MHV called Relay Health, which has a method of SM within that program. There was no other way to explain the disparity in the numbers of women participating in this study.

Findings in this study related to SM and age are consistent with those of Ralston et al. (2009). Ralston et al. reported that the greatest users of messaging in healthcare

were those 50 to 65 years of age. The greatest use of SM within this sample occurred in the age range of those 55 to 64 years. The next greatest use of SM was demonstrated by those in the 65 to 74 age range. In this sample this was evidence of a technologically-adept group of individuals greater than age 50, as Ralston et al. reported. It was also encouraging to see that nearly as many 80 and 90 year olds use the system for communication with their providers as did the 20 and 30 year olds.

The emotion and tone demonstrated in messages by veterans or caregivers of all ages and genders was usually very personal when communicating with the healthcare team. The tenor of the messages was relaxed. There appeared to be good relationships between providers and patients, as demonstrated in many of the messages displayed in Chapter 4. Mutual care for each other was evidenced in several message themes. Best wishes and happy holiday messages are prevalent. The veterans and their caregivers secure messages generally appear to be written with a comfortable tone.

Reviewing patterns of use in this study demonstrated that most messages were written between the hours of 9 a.m. and 6 p.m., and most frequently on weekdays. There are several possible reasons for this finding. It is possible that SM users are most active during these times because they believe their provider is more accessible and will be more responsive to their needs. Conversely, this finding may indicate that though many secure messages were written by work-aged people, during daytime work hours they may not be employed. Or, it could be that some of those employed individuals wrote secure messages from their place of work. There is no way to discern this information.

This is the first study to also look at pattern of use of SM. Within a subset sample of pattern of use, women accounted for 13% of the total sample, reflective of the percent of messages written by women in the full study. Pattern of use by age was also reviewed. In this subset, the age group with larger numbers of secure message writers was that of those within the 65 to 74 year old group, followed by the 55 to 64 year old group and these groups wrote messages later into the evening, than did other age groups. Weppner (2010) was the only author identified who found that men between 65 to 69 years having the highest use of SM. All other research pointed to use of those younger persons being greater utilizers of the Internet and its functionality (Jones & Fox, 2009; McInnes, Gifford, Kazis & Wagner, 2010).

Haun et al. (2014) recently discussed the perceptions of 32 veterans (79% men) using SM at two VA hospitals. The veterans expressed satisfaction with the timely manner of Secure Messaging communication, generally receiving a response from their primary care team within 48 hours. Veterans reported no problems understanding secure message responses from their primary care team members. Few veterans noted being uncomfortable sharing private health information through SM, or about their use of SM. Haun et al. reviewed the veterans' use of SM; the participants stated that they valued SM as it provided them 24/7 access to their clinical team. In the Haun et. al. study, the veterans also reported staff resistance to the use of SM. Although not investigated in the current study, inquiry into the issue of staff resistance or acceptance is critical to the future of the SM program.

Not clear was the extent of input by providers, or indeed whether any input by providers was sought in the development of the SM program at various locations. At this



healthcare center, nearly 60% of messages were answered within eight hours (S. Cech, personal communication, April 17, 2013), which could contribute to its use by patients. Review of secure messages requires attention to detail and thus requires extra time in the clinician's day. Unlike a telephone call, a secure message provides written proof of what was said by both the patient and the clinician. Thus, the secure message, now saved to the EHR, has become legal proof of discussion and instructions between clinician and patient. That legal record could cause some degree of pushback by providers to using SM. As a potential result of this, messages need to be constructed with clarity and with ease of understanding by the patient or caregiver. Byrne, Elliott, and Firek (2009) surveyed VHA clinicians who were utilizing a "home-grown" version of SM, called Portal Mail. They surveyed clinicians in primary care. Twelve out of 31 clinicians at that VA used the SM system. Those 12 clinicians communicated using SM an average of 1.71 message threads per week. Byrne, Elliot, and Firek noted that 60% of clinicians who chose not to utilize SM were thought to be experiencing "clinical adoption inertia", that is, an unwillingness to change and adopt SM system due for four reasons: information overload, paperwork burden, volume of computerized alerts, and additional tasks associated with computerized order entry.

Ralston et al. (2008) reviewed email in primary care settings and suggested applying a five dollar incentive for every message answered by providers. There are other ways to incentivize and encourage attention to messaging and the quality of responses. Whether that is recognition or publication of the clinical team for excellent work and turnaround time in the area of SM, it could also take the form of a simple awarding of a few hours of time-off for strong healthcare team support of SM. Staff

members should have recognition and reinforcement for a job well done and for work that is an add-on to an already stressed work environment.

The outcomes of this study have implications for users, clinicians, hospital administrators, and technical staff. This study could be the springboard to additional analyses of SM within the VA and elsewhere. There is a considerable potential for SM to impact clinical outcomes and patient-staff interactions. Education of these stakeholders on findings of this study could positively influence SM use as each moves forward in their use of this new technology.

### **Limitations**

This study was limited by its size and the fact that it is generalizable only to a small population at a VA hospital in the Midwest. These results may not even be generalizable to other VA hospitals, and may not be congruent with results from non-VA hospitals. This VA was also different in that it also cares for a large active duty population, some of whose messages may have been reviewed in this study, though that cannot be determined at the level of this study. The ability to differentiate active duty from veteran would require further access to the medical record, which was not requested in the Institutional Review Board application and would require additional justification.

Further, only patient messages to providers were examined. This review takes nothing into account from the clinician's point-of-view, nor does it look at providers' messages to patients, which could have a very different take on the topic of SM. Thus, this research was limited only to the patient's use of the SM system.

Although the number of messages seemed very overwhelming when being read, there were only 1200 messages reviewed. This system is also only 30 months old.

Reviewing messages in the future, when both patients and clinical staff are well-versed and facile in the use of SM, may bring other issues to light.

### **Significance**

#### **Practice**

Nurses as professionals are the educators of patients in every environment (ANA, 2010). Teaching patients to appropriately use SM, along with communication of health promoting ideas and disease prevention, falls squarely under the aegis of Standard 5B of nursing's Standards of Professional Practice (ANA, 2010). As a result of the outcomes of this review of secure messages in a healthcare facility, we can begin to understand patients' concerns regarding their healthcare, that some patients strongly value technology in relation to a degree of problem-solving in their daily lives, and how they use SM overall.

Patient-centeredness is a term coined long ago by Carl Rogers in 1951, though then it was referred to as "client-centered". Today the Institute of Medicine (2001) recommends it as the best care model. SM is one way to provide patient-centered care to our patients we care for. It is fast, effective, and can be utilized by both clinicians and patients day and night. It leaves a record of suggestions and becomes part of the clinical record.

Patients do use the available technology and findings from this study point to some methods of improving SM use. For example, from the standpoint of clinicians including nurses, answering secure message after secure message for medication refills does not seem to be an efficient use of the professional's time, when telephone systems and portals already exist for this process. To break the cycle of using secure messaging

as the primary portal for medication refills will require ongoing education of patients and significant others on best practices of SM, appropriate use of messaging, avenues better suited to medication refills, frequency of messaging, use of the SM system, and other concepts to organize correct use of messaging, will also begin to assist the clinical staff in efficient, as well as effective use of SM.

Another example of a problem is the nearly unintelligible format in which patients and their significant others reported fingerstick glucose results to providers. Those results could be easily misinterpreted, and could potentially lead to patient safety issues related to insulin dosing. The MyHealtheVet system needs to develop a template or other columnar format within SM for patients to enter fingerstick glucose results in a safe and efficient manner. Doing so could prevent inappropriate changes in insulin dosage based on difficult or impossible to read blood glucose results. Further, a separate area devoted solely to the reporting of these data would ease retrieval of information and keep these vital reports from being lost among many other messages. Nurses should take a key role in advocating for patient safety related to the SM program in the area of reporting of home blood glucose results, insulin dosing, and reporting of other vital signs by veterans.

Technology is ever-evolving. The VA is staying abreast of changes throughout the country by offering new modalities for patients to remain in contact with their health care team. The next advance in the ability to send secure messages, may include the actual ability to text one's healthcare team, or an SM application to be used on a smart-phone, though that has not been discussed here.

## Theory

The use of the theory, Individual and Family Self-Management Theory by Ryan and Sawin (2009) guided and strengthened this study. Social facilitation, as a factor related to the process dimension in the IFSMT, assumed family/friend support which was evidenced by messages from a variety of correspondents; family members and friends. Collaboration and a degree of socialization between the clinical staff and the patients occurs on these messages as evidenced by the topic “replies to provider’s inquiry” and the overwhelming number of messages conveying thanks and wishes for good holidays and wishes for happiness. Further review of the impact of secure messages on family/friends utilizing the system is important as well.

What remains unknown are the distal outcomes of the IFSMT, and that was excluded as part of study design. As noted earlier, some researchers have looked at changes in HEDIS scores, which is a somewhat longer and clearly measurable outcome. Reviews of glucose monitoring and changes in vital signs are potentials for further study based on the utilization of SM within the VA’s MyHealthVet program, the Department of Defense’s Relay Health messaging system and other, similar portals.

As the IFSMT model is conceptualized as reflecting the incorporation of health-related behaviors into routine living, this theory was an excellent model for this study. The tenet has been borne out by review of the patterns of use of SM in everyday life, at all ages and in both men and women.

Also evident and strongly theory-related, is the example of SM as a manifestation of self-management. From users’ apparent authenticity in their writing and their themes and topics, self-management is their goal. Though not used as the actual theoretic

framework on which this study was based, the SM system supports and displays components of Lorig's model (1996) of self-management. Veterans deal with the consequences of illness, keeping providers updated on need for medications, changes in conditions, and certainly question and write ongoing commentaries to their providers. The second component was not tested, but from the outside, the SM system appears to assist the veterans with problem solving regarding their illnesses. Questions can be posed at all hours of the day and on weekends. Within this healthcare system the turnaround time from question to answer is relatively rapid. The third component of the Lorig model of self-management suggests that partnerships should be built between patients and providers; SM is an excellent example of relationships that exist between some of these veterans and their providers.

As both healthcare and SM systems continue to evolve, SM can be the hand that bridges gaps and frustrations that may result from growth and expansion. As patients become more involved in their care, that involvement may result in more questions and commentaries. Self-management and secure messaging may become a symbiotic relationship.

### **Policy**

Local policy could potentially be guided by this evaluation of SM. This local healthcare system is invested in promotion of SM as a means of communication between patients and clinical staff. Patient education should include modules on SM. Secure messaging should be a component of hospital orientation for the clinical staff. The use of SM programs should be implemented in areas outside of primary care. As evidenced in this study, patients have many questions, comments, and concerns, and these occur on an

ongoing basis. In this day, and with an aging population, where it may be difficult to drive or find on-call transport to drive to see a provider, a quick message between veteran and clinician could relieve minds of worry or enable a patient to deal with a health issue that may have become a health risk. This could be determined through the SM system.

The use of SM throughout the healthcare continuum may be impacted if clinical staff have a greater incentive to utilize the system. As noted previously, this could take the guise of acknowledgement and publication for excellence in SM within the healthcare system, time off awards, or other perks that are developed. There may also be some resistance to the use of SM by providers, as it adds another level of care that they must provide to their patients. Appropriate time allocation and performance evaluations will need to change to address this aspect of patient care. Hospital administrators need to recognize the impact SM has on the clinical staff, shifting time and attention required for patient communication to already stretched schedules. Rewards are a way to make providers more interested in messaging. Medical record coding in the presence of a secure message is another avenue to pursue—that would be an acknowledgement of workload. And coding using correct procedure codes would add a financial incentive to SM.

In an age where technology is pushing boundaries at every corner, it is only logical that patients who utilize texting applications within their own families, will soon see it as a desirable option to send secure *text* messages to clinical staff. Security comes to bear in this arena, but in this day where people globally worry of security when using texting programs, a secure texting program may be on the technical horizon.

The study of SM on users of this healthcare facility can lend information and guidance for education of patients as VHA informatics and administration continue their work with the MHV SM program. Review of broader patient outcomes as a result of SM could be accomplished as was studied by Zhou, Kanter, Wang and Garrido (2010); these authors demonstrated improvement in HEDIS scores on four measures as a result of SM.

There is the opportunity for study findings to impact education from other departments within the hospital as the program grows and evolves. The SM program has had a somewhat limited use to date, utilized mainly by the primary care arena as well as primary care provisions within the mental health department. There is certainly potential for this program to move further into specialty clinics and early evidence can be seen as several of the messages reviewed here were directed at the clinical staff in the endocrinology clinic. However, there are significant limits of SM program use outside of the primary care, which may be due in part to the PACT (Patient Aligned Care Team) structure that fosters ongoing engagement with the patient.

This MHV SM system does require extra time of all clinical staff involved and recognition of the workload with this program should be part of employee education if they are to use it effectively. It requires attention to detail; it mandates untangling some emotions that are embedded in the messages and interpreting communications that suffer from misspelling and malapropisms. Since secure messages appear in the EHR, it is a part of the legal record. Instructions given by a clinician to the patient in a secure message are not unlike writing a prescription for a treatment or the listing of steps in a complicated procedure. Unlike a telephone call, there is clear evidence of what is said to



the patients, undoubtedly this aspect can weigh on the clinicians and their responses need to be carefully structured.

### **Research**

The process of SM, its use, attitudes about SM, and outcomes, is an area well suited to further examination by researchers. SM is a newer technology as evidenced by the small number of studies available for review of the topic. As SM becomes a more frequently used system for communication between patients and providers, it is hoped that an increase in research will be forthcoming. In this sample, there was clear evidence that the largest technologically-adept group users were aged 50 to 65, as Ralston et al. (2009) reported yet this also expands that age range to include the next largest group of SM users: those in the 65 to 74 age range. Questions remain as to what makes this group the greatest users of SM. Interestingly, one would normally conclude that the most tech-savvy and electronically-inclined age range would be the 18 to 30 year olds. Does the availability of free time for retirees play into it this? Or is it as Ralston et al. (2008) stated: the best predictor of use of SM was for patient with the greatest overall morbidity? Morbidity and disease processes were not assessed in this study, but should be included in future research.

Given this very current rich database, additional research could be undertaken employing secondary analysis. Evaluation of the most frequent topic, medication, in terms of the number of requests for controlled substances versus renewal of routine medications could be of value, as could a review of themes by patients versus themes written by significant others. Another area of investigation could involve a review of the order of themes in terms of message significance. In other words, exploring whether

patients write the most significant issue first or last within the themes contained within the messages would be beneficial, as such information could help alleviate healthcare time constraints. Additional areas of inquiry could involve examining the relationship between diagnoses and patients' messages. Further investigation could also include a review of number of messages, day of week, and time of day that each of several individual users message over a period of time, such as a six month time frame. Investigating the relationship between personal health history of those who write messages at the extremes of time of the day, such as those who write at 11:00 p.m., or 2 a.m., or 5:30 a.m. could yield critical information for healthcare providers.

Next steps in the research process in regards to self-management could include the utilization of findings in the area of self-management necessary for dealing with chronic diseases. Persons suffering with multiple morbidities would add further support to the utilization of IFSMT in secure messaging. Lorig, Sobel, Ritter, Laurent, and Hobbs (2001) wrote that self-management emphasizes the individual's role in managing his or her illness, assisting with medical management, providing patients and significant others with necessary knowledge, skills, and confidence to deal with disease-related problems and to collaborate with healthcare providers and the healthcare system. Patient use of SM seems to be congruent with the assumptions of self-management and in particular aligned with IFSMT. Study of SM in patients with higher incidence of morbidity is therefore another suggestion for future research.

Another area that supports further investigation is the impact of SM on clinical staff. Questions such as how staff manage and handle incoming messages from patients, i.e., what number of messages is answered in the course of their work should be

reviewed. How the clinical staff perceives the impact of SM on patient outcomes and how they utilize that to the patient's advantage is a valid query that could open more investigation. Examining messages in relation to clinician response is another area ripe for investigation, as is examining clinician responses from a medical-legal perspective. . Review of clinicians' initial queries to patients and responses to patients' secure messages in lengthy secure message threads is thought-provoking, interesting, and important to provide a complete picture of the use of SM.

An as yet unexplored area of investigation relates to the impact SM has on clinical staff. Such questions as

- What amount of time is allotted to the practice of SM for the clinical staff?
- How do staff perceive patient's expectations of them in regards to messages sent?
- How much time is spent in the course of the day on telephone calls versus SM?
- Do patients internalize or make different, preferred clinical changes based on telephone calls versus SM?
- Have the number of patient telephone calls decreased in relation to an increase in SM?

Investigating clinical staff's perceptions and expectations of SM in contrast or similarities to patients' perceptions and expectations is another potential area for future endeavor. A survey of several clinicians' to determine their responses to a set of patients' SM questions would be of interest, to determine if clinical staff read and consistently understand information in the same manner. A time study of various clinics and clinicians use SM throughout the course of a work day may yield additional insight about the utility and effectiveness of SM.

Lastly, revisiting the data from a more qualitative perspective would provide a different view of patients' experiences using SM. Many messages were quite lengthy and contained multiple themes and topics. Deconstructing these messages would add to the current limited understanding of SM use.

This study of patients in one VA facility was a limited view of patients' use of SM. This study supports the findings by Haun et al., (2014). Both of these studies reviewed SM from the patients' perspective. In the Haun et al. study, VA patients reported VA staff resistance to the use of SM. Of interest and benefit would be the perception of SM from the clinical staffs' view. It is not even known if there *is* staff resistance to SM or if the clinical staff appreciates SM. We might speculate that staff resistance to SM could be caused by several factors; interruptions to their routine not only by phone calls and door-knocking, paging and meetings, and a host of factors that would be understandable in regards to some opposition to the secure message system. The current study did not address clinical staffs' attitude toward SM, but that is an area of interest for further exploration. SM is another interruption in a busy day and requires insight and care in responding to patient and significant others' messages. As this study points out, messages must be read several times to glean what is really being said by patients or their friends or family members. SM requires time and effort by providers to assure a safe outcome for patients.

Another unintended consequence of SM for providers is anticipated turn-around-time for SM. This is already being tracked to some extent by the VA, though not addressed in this study. In this day of texting and instant messaging, consumers of all ages expect a rapid response in many venues. Included among that will be, if not already

there, a rapid response to SM. That response time should be studied from both the patients and the clinical staffs' point of view. Over the past several years we have begun employing this great technology to communicating with our providers and patients, but we have not reviewed its impact on patient care.

### **Conclusions**

The following conclusions can be drawn based on the results of this study:

1. Veterans and their families and friends focused the content of their messages on ten topics.
2. Medication issues were the most frequent topic discussed overall irrespective of age of user.
3. Symptoms or changes in condition were the second most frequent topic, irrespective of age.
4. Men, as a group, wrote more about medications than women
5. Women wrote more about their symptoms
6. Most secure messages were written by those in the age range of 55-64, followed by those in the 65 to 74 year range.
7. The pattern of use for secure messaging occurred most frequently on Tuesdays and Thursdays between the hours of 9 a.m. and 3 p.m.
8. Women wrote secure messages most frequently on Tuesdays and Fridays, from 12 noon until 3 p.m.
9. Men wrote secure messages most frequently on Mondays, Tuesdays, and Wednesdays and from 9 a.m. until noon.

The Institute of Medicine (IOM) suggests a plan for 21st century healthcare that includes aims to improve the quality of healthcare (2001). These aims for quality include patient-centeredness. Patient-centeredness has several dimensions which incorporate the requirement for patient information, communication, education, and support, as well as involvement of family and friends. Patient-centered or client centered—the premise is the same as that which Rogers in 1951 spoke of. Many of these aims can be supported through the use of SM. This system of messaging needs to be further investigated so we can all continue to support our patients, improve their care, while utilizing SM to lead to improved patient outcomes.

### **Chapter Summary**

The findings of this study were discussed and placed within the theoretical context. The limitations and conclusions of the study were offered. Suggestions for improvement in the SM program were set forth. Additionally, recommendations for future research were presented.

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**Appendix A**  
**Institutional Review Board Approval, VHA**

**Appendix B**

**Institutional Review Board Approval, University of WI, Milwaukee**

**Appendix C**  
**Coding Instructions**

1. Read the text message in Column N
2. Determine major theme of message
3. Record the theme of message in Column J
4. Re-read the message to determine if any other themes are discovered
5. If additional themes are noted in a message, record each theme in Columns K, L,  
and column M as necessary
6. Return information to me
7. Call with any questions/comments

## Appendix D

### List of themes

#### Notes after initial review of themes:

78 themes w/overall discussion of appts, *not* incl update on consultant appt  
 3 BP readings  
 34 bs results  
 14 complaint of issues 12 related to symptoms  
 23 notes of concern  
 77 requests for consults  
 8 c/o Rx lost/late in mail  
 7 emoticons (1 sad below)  
 1 erectile dysf and 5 c/o prob w/penis or need attachm  
 7 frustration 6 anger 5 distress w/people or system  
 31 "needs" from prov  
 62 requests for results of tests or procedures  
 13 needs of "things"  
 16 c/o pain  
 2 prob w/MHV  
 56 questions  
 431 requests for Rx refill  
 11 req for antidepr  
 8 req for antihypert  
 10 req B block  
 29 req cardiac meds  
 43 req diab Rx/supplies - 2 further down as insulin  
 20 refill inhalers  
 19 req for ms  
 10 req for opioid  
 35 requests for oxy  
 12 req refill pain  
 10 refills for sleep  
 28 req statins  
 9 ref viagra  
 18 replies to provider message/question  
 Plus 21 responses to provider mess below!  
 28 reports of ED visits or hospitalizations  
 21 responses to provider question  
 Plus 18 replies to provider messages up above!  
 1758 issues/message themes  
 7 req to get appt squeezed in  
 69 Symptoms  
 + 12 other from "c/o" area

23 Thanks  
 14 uncertainties  
 Unhappy w/MHV  
 87 updates on condition  
 41 updates on consultant appts  
 37 "wants" from provider/VA  
 uncertain who conversing with  
 refill Rx anticoag  
 report on condition  
 report of symptoms: nosebleed/? BP elev  
 refill Rx cardiac  
 how to f/u appt  
 looking for MD  
 refill Rx oxycodone 30+

### Alphabetic Listing of All 1720 themes

|  |  |
|--|--|
| 4 "pleases" to be seen that day (please, please, please, please) | acetaminophen not working                    |
| agreement on rx dosage/split                                     | agrees to f/u w/PMR                          |
| 3 agrees to see consultant                                       | agrees to see consultant                     |
| 2 anger at VA  | agrees w/need for imaging exams              |
| anxious for test results   | anger  |
| apology to MD  | anger  |
| Appointment clarification  | anger w/staff member                         |
| 3 need appt  | apology                                      |
| appt w/pulmonary   | Appointment clarification                    |
| at outside facility  | Appointment clarification                    |
| awaiting surgery   | appt   |
| awaiting refill  | appt   |
| awaiting refill: Cardiac   | appt   |
| billing issues   | argumentative                                |
| blood glucose results  | awaiting refill Rx cardiac meds at Walgreens |
| book appt now  | awants info on f/u                           |
| 3 bp results   | awaiting refill: Cardiac                     |
| broken dme   | believes opp of MD instruction               |
| 38 bs readings   | blames optom                                 |
| c/o abdominal pain   | bloody gums                                  |
| c/o chest pain   | bs levels: increasing                        |
| c/o increasing anxiety   | c/o carpal tunnel                            |
| 2 c/o LBP  | c/o drug testing                             |
| c/o Medication changes   | c/o increasing pain                          |

|  |   |
|--|---|
| 2 c/o pain   | C/o receipt of broken rx products                           |
| c/o symptoms sciatica                                | c/o URI   |
| can provider call in script or mail one out of state | Can pt get outside prescribed Rx at VA                      |
| cancel appt for same date                            | cancel appt in Another clinic                               |
| cancel Rx  | cannot repair reason for visit                              |
| cardiac surgery in weeks                             | change cardiac Rx due to cough                              |
| 2 change appt time                                   | change in req for test                                      |
| change in condition: flank pain                      | change to tylenol instead of allopurinol                    |
| change Rx for NSAID                                  | 2 changing cardiac meds on own                              |
| changed antidepressant                               | changing to outside consultant                              |
| 2 check in   | chest pain  |
| check to see if prov read message                    | clarification   |
| chronic pain   | clarify appt date   |
| 2 clarification of appt                              | clarify labs and rx   |
| clarification of labwork                             | complaints/threats to provider                              |
| clarify f/u appt w/specialist                        | complying w/plan for meds                                   |
| clarifying refill rx process                         | concern about bladder cancer                                |
| 2 complete paperwork                                 | concern over father's condition                             |
| compliment on care rec'd                             | concern over injury   |
| 4 concern  | concern over lab test                                       |
| concern over cardiac status                          | concern over starting husband on too high dosage of thyroid |
| concern over health                                  | concern that diab Rx led to cancer                          |
| concern over injury and lack of f/u                  | concern that Rx did not arrive in mail                      |
| concern over rash                                    | concern-change in health status                             |
| concern over symptoms                                | concerned about lack of communication from providers        |
| concerned about condition                            | concerned re: BP  |
| concerned over husbands loss of independence         | condition improving   |
| condition day-by-day for month                       | confirmation of need for Rx                                 |
| confession of breaking narcotic contract             | confused over consult ordered                               |
| confirming appt for next day                         | confusion over elements to take as Rx                       |
| confusion  | confusion over insurance/VA payment of diabetes Rx          |
| confusion over fee basis paperwork                   | confusion over phone # and appt                             |
| confusion over mis-ordered dme - will call back      | consult request: acupuncture                                |
| consult request: ? Surg                              | consult request: colonoscopy                                |
| 2 consult request: audiology                         | consult request: dietician                                  |
| 3 consult request: cardiology                        | consult request: fee basis PT                               |
| 5 consult request: derm                              | consult request: gyn  |
| 12 consult request: dme                              | consult request: Milw audiology                             |

|   |  |
|---|--|
| consult request: driving                      | consult request: neuro                         |
| 2 consult request: ENT                        | 3 consult request: ortho                       |
| 7 consult request: eye clinic                 | consult request: outside PT clinic             |
| 3 consult request: fee basis                  | 3 consult request: pain clinic                 |
| consult request: GI                           | consult request: prosthetics                   |
| consult request: hematology                   | consult request: sleep study                   |
| 2 consult request: MH                         | consult request: urology for penis ring        |
| consult request: neuro                        | 2 continued physical discomfort                |
| consult request: neuro                        | could be distressed over dx                    |
| consult request: OT                           | could rash be from celebrex                    |
| consult request: outside referral             | decreasing Rx as prescribed                    |
| 3 consult request: PMR                        | 2 difficulty breathing                         |
| 7 consult request: podiatry                   | difficulty seeing prov at other VA             |
| consult request: podiatry - Milw              | discontinues that Rx                           |
| 2 consult request: pulm                       | discussion of cost of rx                       |
| consult request: rec therapy                  | Discussion of symptoms                         |
| 3 consult request: urology                    | Disgtress/Anger                                |
| continued back/neck pain                      | distress over consult                          |
| could come for appt                           | do not hesitate to refill narcs                |
| d/c'd oxy                                     | doesn't want to pay extra \$                   |
| 2 did not receive Rx in mail                  | 5 emoticon smiley                              |
| did not refill in time                        | encouragement from family                      |
| difficulty cutting pills/discriminating pills | exercising                                     |
| difficulty w/prosthetics/dme                  | exposure to pneumonia                          |
| discontinued statin on own                    | f/u and preceeding appt                        |
| discouragement                                | f/u on appointments                            |
| 2 discussion of lab results                   | f/u on PT                                      |
| discussion of other appt                      | family wants to change dosage of cardiac meds  |
| discussion of test/procedure                  | fax labs to outside agency                     |
| disputes results of EMG                       | fearful  |
| 2 distressed w/consultant                     | finding own consultants                        |
| distressed w/VA                               | 7 follow-up from other clinic's recommdations  |
| does not see need for repeat lab tests        | getting VA Rx filled on outside                |
| drinking less                                 | has unused Rx and uncertain what to do with it |
| emoticon smile x3                             | hello  |
| erectile dysfunction                          | How to f/u medical care                        |
| exposed to person w/pneumonia-wants Rx        | hurt neck 4 mos prior                          |
| eye pain/visual disturbance                   | hx of taking many narcotics                    |
| F/U of PMH                                    | improved symptoms                              |
| f/u on meds and labs                          | improving condition                            |



|  |   |
|--|---|
| 4 f/u on testing                           | increase # of Viagra pills                          |
| f/u w/PMR                                  | increase dosage SSRI                                |
| family member notes changes in vs          | increase in size of wound                           |
| fax form to outside agency                 | increased dose of thyroid on own                    |
| fax list of Rx                             | increasing tinnutis                                 |
| fell and injured wrist                     | info on secondary VA                                |
| first checks on condition of provider      | Inquiring of VA sxs                                 |
| 2 follow-up on missed appt                 | interest in LTC facility                            |
| forward copy of Rx to eye clinic           | issue w/change in diabetes Rx                       |
| 5 frustrated                               | labs to be drawn this week                          |
| frustration w/system                       | labwork prior to visit                              |
| had discussion w/COS office at Mad VA      | leaving other doc                                   |
| 29 happy holidays                          | likes cane  |
| has swelling LE                            | listing of physical complaints                      |
| hasn't received refill in mail             | looking for prov input                              |
| how to f/u appt                            | lost/misplaced Rx                                   |
| how to order batteries/hearing aid         | meds d/cd   |
| hx of bone dx                              | missed appt too busy                                |
| impact/cost of HC on insurance/life        | missing Rx?   |
| Improvement of ED                          | more tired  |
| in ED prev day                             | need follow-up lab test                             |
| increase dosage pain Rx                    | need report on restrictions                         |
| 6 increase in pain                         | need to complain of rx and people who put him on it |
| increase wt loss Rx                        | Needs access to Tele- program                       |
| info being sent from outside provider      | needs answer now                                    |
| injectable prostaglandin vs viagra         | needs batteries for TENS                            |
| instructions on new muscle relaxant for MS | needs clarification of test results                 |
| interest in LTC facility                   | needs earlier appt than scheduled for               |
| issues...                                  | Needs f/u appt for increasing pain complaints       |
| labs from outside system                   | needs f/u p/ED visit                                |
| labwork at CBOC                            | needs handicapped sticker renewed                   |
| late paying bill                           | needs info re: test/proc                            |
| left provider phone number to call back    | needs letter to return to gym                       |
| list of current Rx                         | needs MRI   |
| looking for MD                             | needs outside meds filled at VA                     |
| looking for Rx similar s/side effects      | needs paperwork completed                           |
| 2 looks to provider for guidance           | needs PAT and H&P                                   |
| 2 made appt                                | needs pre-admission testing done OR at Milw VA      |
| 2 make appt                                | needs Rx  |
| meals                                      | needs Rx for yeast inf                              |

|  |   |
|--|---|
| metformin & h/a  | needs Rx Viagra   |
| missed appt too sleepy                                       | needs to take more viagra than prescribed                     |
| monitoring vs  | Needs update on rx  |
| multiple issues: nail ridges, drinking to flush kidneys, etc | new glucose meter   |
| need for PAT testing/appt                                    | next appt   |
| need results of test/procedure                               | no increase in wt   |
| need to worry?   | no need for particular refill                                 |
| needs advice about stopping asa/warf prior to procedure      | not certain if prov needs to see first                        |
| 8 needs appointment  | not satisfied w/dme   |
| needs appt but time far out                                  | not tolerating Rx from GI standpoint                          |
| needs assurance for further procedures                       | notice of upcoming appt                                       |
| needs clarification of change of rx                          | old symptoms return   |
| needs diaper for invol bm                                    | order labs same day as appt                                   |
| needs eye appt   | overwhelmed w/husband's d/c to home                           |
| needs f/u from consulting clinics                            | pain continues: back  |
| needs H&P for new job  | pain improving  |
| 2 needs help w/form  | pain in shoulders   |
| needs increased pain medication                              | pain knee   |
| needs intervention for appt at Hines VA                      | pain: shoulder  |
| 5 needs labwork ordered                                      | plans for next appt   |
| needs less expensive RX                                      | Preparing for post-op pain outside FHCC, wants to line up Rxs |
| needs long acting seizure Rx                                 | prob w/sending message to wrong provider                      |
| needs orders placed for test/procedure                       | problem w/dme   |
| needs pain meds  | problems w/eyeglass prescription                              |
| needs paperwork completed                                    | pt being treated at outside assist.living facility            |
| needs pre-admission testing done for Milw VA                 | pt sends SM to f/u from phone call from doc                   |
| needs refill simvastatin                                     | quest re: antidepressants                                     |
| 61 needs results of tests/procedure                          | quest re: treatment and continued physical discomfort         |
| needs Rx for toothache                                       | question about lab tests                                      |
| needs Rx stronger than oxy                                   | question about test prep                                      |
| needs test/procedure ordered                                 | question date of immunizations                                |
| 2 needs to make appt for f/u                                 | question if should receive shingles vac while p/cold          |
| needs transport to city                                      | question need for current rx being taken                      |
| new BP rx not decreasing BP                                  | question need to stop Rx                                      |
| 3 new symptom  | 4 question re: next step in HC plan                           |
| nf Rx  | question re: completion of forms                              |

|  |   |
|--|---|
| no longer constipated  | question re: condition                        |
| no relief from tramadol                                      | question re: group sessions re: pain          |
| not received Rx in mail                                      | question re: memory OTC Rxs                   |
| not SOB  | question re: stopping meds<br>coumadin        |
| Note re: heading to Emerg Dept                               | question re: upcoming lab work                |
| notices symptoms   | question re: vitamins                         |
| 2 order blood work   | question re; herbal                           |
| order labs prior to appt                                     | question why much blood taken by<br>lab       |
| out of Rx  | Questioning dx                                |
| 2 pain   | questioning meds                              |
| pain breast  | questioning refill rx                         |
| 2 pain continues   | questions diagnosis                           |
| pain continues: neck and back                                | questions if should be on antibiotics         |
| pain in neck   | questions re: LFT                             |
| pain increased   | questions re: next step in HC plan            |
| 2 pain increasing  | questions re: treatment plan, ED              |
| pain: LLQ  | quit school                                   |
| plan for OTC nutritional supplement                          | rash  |
| preparation for upcoming appt                                | reaction to Rx                                |
| prob w/MHV   | reason for not getting lab tests<br>completed |
| problem getting Rx   | received bill/charges for meds not<br>happy   |
| problem w/shipping Rx  | received Rx and didn't know why               |
| provider to complete paperwork                               | refill antidepressant                         |
| PT increasing need for pain Rx                               | refill at outside pharm                       |
| pt thinks should have synthr increased                       | refill choleterol med                         |
| question re: condition                                       | refill opioid anagesic                        |
| quest re: test   | refill parkinsons rx                          |
| question about insulin, diabetic Rx and effect<br>on kidneys | refill Rx acetaminophen                       |
| question about test prep                                     | refill Rx ADHD amphetamine                    |
| question BPH med   | refill Rx allergy med                         |
| question if cramping due to Rx                               | refill Rx antacid                             |
| question if VA carries rx                                    | refill Rx antidepressant and other rx         |
| question need for proposed colonoscopy                       | refill Rx antifungal                          |
| 3 question of next steps in Tx                               | refill Rx arthritis on outside                |
| question re: appearance of Rx                                | refill Rx asa                                 |
| Question re: condition                                       | refill Rx at outside agency                   |
| question re: follow-up                                       | refill Rx bisphosphonate                      |
| question re: h/a and metformin                               | refill Rx cortisone cream                     |
| Question re: MHV meds  | refill Rx cyanocobalamine                     |

|   |   |
|---|---|
| question re: rx   | refill Rx diuretic  |
| question re: symptom                                    | refill Rx ear drops need flush                                      |
| 2 question re: testing                                  | 2 refill Rx fentanyl patch  |
| question re: vaccine                                    | refill Rx folic acid  |
| question re: wound                                      | refill Rx gabapentin - ?lost in mail                                |
| question Rx on list                                     | 2 refill Rx glaucoma  |
| questioning cardiac meds and relates Rx to feeling weak | refill Rx H2 receptor agonist-pepcid                                |
| questioning medications                                 | refill Rx hyperlipidemic  |
| questioning refill rx                                   | refill Rx immodium  |
| questioning where and if new Rx ordered                 | refill Rx iron  |
| questions if labs prior to appt                         | refill Rx keratolytic   |
| questions if should go to ENT or ED                     | refill Rx laxative  |
| questions/comments re: drugs and lab tests              | refill Rx lomotil   |
| quote from research                                     | refill Rx lyrica  |
| re: appt  | refill Rx mom   |
| rec'd call for appt to consult clinic as requested      | refill Rx multivit  |
| received different Rx than expected                     | refill Rx naprosen  |
| refill all Rx   | refill Rx narcotic  |
| refill anti-inflammatory rx                             | refill Rx omeprazole  |
| refill cardiac rx                                       | 31 refill Rx oxycodone  |
| refill cough rx   | 11 refill Rx Pain   |
| refill opioid analgesic                                 | 2 refill Rx PPI (prilosec)  |
| 8 refill Rx   | refill Rx psyllium  |
| refill Rx acetaminophen                                 | refill Rx rheum art(humira)   |
| refill Rx acetaminophen                                 | refill Rx rosacea cream   |
| 7 refill Rx all   | refill Rx specific statin   |
| refill Rx amphetamine                                   | refill Rx stool softener  |
| 8 refill Rx antibiotic                                  | 7 refill Rx thyroid   |
| 9 refill Rx antidepressant                              | refill Rx tramadol/gaba   |
| refill Rx anti-epileptic                                | refill Rx triglycerides   |
| refill Rx antihistamine                                 | 7 refill Rx viagra  |
| 7 refill Rx antihypertensive                            | refill Rx viagra (levitra)  |
| 3 refill Rx antiinflamm                                 | refill Rx w/stronger than NSAID                                     |
| 2 refill Rx anxiolytic                                  | refill Rx with 1/2 dosage of current rx to obviate need to cut pill |
| 3 refill Rx arthritis                                   | refill Rx: incontinence items                                       |
| refill Rx ASA   | refilling VA Rx on outside  |
| refill Rx atypical antipsychotic                        | refills not arriving  |
| 11 refill Rx B blocker                                  | relates family health issue   |
| refill Rx bentyl/IBS                                    | 20 reply to provider message  |
| 5 refill Rx benzodiazepam                               | reply to req for ret visit  |

|  |  |
|--|--|
| refill Rx bisphosphate                   | reply to req from MD                                     |
| 4 refill Rx BPH                          | report of home fire                                      |
| 24 refill Rx cardiac                     | report of outside testing                                |
| 2 refill Rx cardiac meds x 2             | report on condition: improved                            |
| refill Rx CHF                            | report on emergency visit                                |
| 2 refill Rx cholesterol                  | report on future visit PT                                |
| 3 refill Rx codeine                      | report on new condition                                  |
| 3refill Rx constipation                  | req consult: Milw ENT                                    |
| refill Rx cough med                      | req for overact blad rx                                  |
| refill rx dementia                       | req for RA rx  |
| 18 refill Rx diabetes                    | req info on surgical notes                               |
| 18 refill Rx diabetes supplies           | request change in Rx post stent                          |
| refill Rx ear drops                      | request consult: ortho                                   |
| 2 refill Rx enoxaparin                   | 2 request for appointment                                |
| refill Rx eye                            | request for f/u  |
| refill Rx fentanyl patch and double dose | request for hearing aid batteries                        |
| refill Rx fleets enema                   | request for increased pain meds                          |
| 5 refill Rx from outside provider        | request for letter to be written for special equipment   |
| 8 refill Rx gabapentin                   | request for proof of vaccine                             |
| refill Rx gabapentin and increase        | request for Viagra                                       |
| 4refill Rx GERD                          | request lab/procedure in advance of appt                 |
| 2 refill Rx gerd/reflux                  | request letter clearing pt to work out                   |
| 4 refill Rx gout                         | request of provider to add tests to already drawn serum  |
| refill Rx HCTZ                           | request Rx nicotine patch                                |
| refill Rx ibuprophen                     | request strong pain killer                               |
| 16 refill Rx inhaler                     | request to send info to outside provider                 |
| refill Rx inhalers from other provider   | Request update of rec: POA                               |
| 2 refill Rx insulin                      | requesting appt  |
| 3 refill Rx K+                           | requesting change in Rx to clopidogrel                   |
| refill Rx lasix                          | requesting lab tests                                     |
| refill Rx lithium                        | requesting new MH provider                               |
| refill Rx lovenox                        | requesting rx for arthrits                               |
| 2 refill Rx magnesium                    | requests change in med form                              |
| 2 refill Rx MDD/Bipolar                  | requests hearing aid batteries                           |
| 2 refill Rx methotrexate                 | requests info on change in VA policy                     |
| refill Rx migraines                      | requests labwork prior to next visit                     |
| 11 refill Rx morphine                    | requests letter approving travel to Las Vegas for 92 y/o |
| 3 refill Rx morphine x 2                 | requests nicotine patch                                  |
| 3 refill Rx muscle relaxant              | requests pills be cut in half                            |

|   |   |
|---|---|
| refill Rx narcotic                            | requests Rx antibiotic                    |
| refill Rx NSAID                               | requests Rx hydrocortisone ointment       |
| 3 refill Rx nasal spray                       | requests rx vit d                         |
| refill Rx nicotine patches                    | requests to gain wt                       |
| 7 refill Rx NSAID                             | re-request for dme                        |
| 4 refill Rx ointment                          | response to call left on machine          |
| 10 refill Rx opioid                           | return of symptoms: tingling w/radiation  |
| 2 refill Rx ostomy supplies                   | review of insulin dose                    |
| refill Rx outside VA                          | review of previous test/procedure         |
| refill Rx pain and overnight Rx to pt         | requests consult: dermatology             |
| refill Rx parkinsons                          | Rx lost/not filled                        |
| 3 refill plavix                               | see consultant on specific dates          |
| 10 refill Rx sleep                            | sending labs in German                    |
| refill Rx prostate                            | sent bs readings/requests response        |
| 2 refill Rx proton pump                       | sent wrong Rx by pharm                    |
| refill Rx reflux/GERD                         | sharing info                              |
| refill Rx rheum arth                          | sharing treatment suggestion              |
| refill Rx shampoo                             | side effects flexeril                     |
| 3 refill Rx SSRI                              | sleep apnea                               |
| 28 refill Rx statin                           | some concern over condition               |
| refill Rx supplies                            | sore ear                                  |
| refill Rx topical corticosteriod              | sores on thighs                           |
| refill Rx tricyclic antidepressant            | start Rx oxycodone/tram                   |
| refill Rx ulcerative colitis                  | stopped taking insulin                    |
| refill Rx viagra - hasn't arrived             | suggest MD learn to use MHV SM            |
| refill Rx vit                                 | supervisor ? Need for return appt to prov |
| 6 refill Rx vit D                             | 8 symptoms                                |
| 4 refill Rx vitamins                          | symptoms - headach                        |
| 2 refill Rx w/stronger                        | symptoms arthritis                        |
| 3 refill Rx warfarin                          | symptoms blood in stool                   |
| refill Rx zantac                              | symptoms h/a - migraine                   |
| refill supplies                               | symptoms of infection mouth               |
| refills Ambien get stolen by USPS or VA       | 3 symptoms of URI                         |
| refused pain meds by VA ED previous noc       | symptoms pain in hip                      |
| 2 relating symptoms                           | symptoms when swallowing                  |
| reminding provider                            | symptoms worsening                        |
| 2 reminding provider of procedures to be done | symptoms: flu                             |
| reply to req for ret visit                    | symptoms: lesion better                   |
| 8 report of BP results                        | symptoms: pain                            |
| report of outside testing                     | symptoms: pain in eye                     |
| report of vs                                  | symptoms: ringing in ear                  |

|   |  |
|---|--|
| report on change in vs                                      | syptoms, report on Improved                        |
| 13 report on condition                                      | thankful for provider                              |
| report on condition: gall stones                            | thanks for time                                    |
| 2 report on condition: worse                                | thanks/ complaints                                 |
| report on discussion w/outside provider                     | thought to be suicidal at other hospital           |
| 2 report on emergency visit                                 | to ED w/HTN bec out of same Rx                     |
| report on emergency visit/hospitalization                   | took antibiotic                                    |
| 24 report on emergency visit/hospitalization outside system | tramadol not working well                          |
| report on new condition                                     | transfer to Milw VA                                |
| report on parent's deteriorating condition                  | Treatment of h/a & scabies<br>Diagnoses            |
| 5 report on vs  | trouble refilling rx                               |
| req for OT things   | trust in provider                                  |
| req for PT products ordered/to be used by outside PT        | uncertain of change in cardiac Rx                  |
| req for smoking cess  | uncertain of consultant's recommendations for care |
| request audiology exams                                     | uncertain of meds to use w/nebulizer               |
| request consult to ortho                                    | uncertain over Rx to take                          |
| request diclofenac even if has to pay by self               | uncertain who conversing with                      |
| request for appointment                                     | uncertainty re: diabetic meds                      |
| request for card rx   | unhappy w/Va                                       |
| 4 request for dme   | update   |
| request for handicapped parking                             | update   |
| request for HIV lab draw                                    | update on appt w/consultant                        |
| request for info to outside provider                        | update on condition and worse symptoms             |
| 7 request for lab draw                                      | update on condition improving post flu             |
| request for letter to be written for employment             | update on condition: ED visit                      |
| request for plavix from outside doc                         | update on condition: injection for pain            |
| request for STD lab draw                                    | update on condition: mixed                         |
| request if father can travel                                | update on condition: pain increasing               |
| request labwork next day                                    | update on condition: was bad, improving            |
| request MRI on advice of oncologists                        | update on condition: worse then possibly improved  |
| request rad report  | update on condition: worse, falling                |
| request Rx to quit chewing tobacco                          | update on condition: worse, multiple c/o           |
| request to cut glipizide in 1/2                             | update on consultant appt: increase Rx             |
| request to use gym on site at FHCC/needs approval letter    | update on consultant from outside                  |
| 2 requesting appt   | update on life                                     |

|   |   |
|---|---|
| requesting appt w/dietician   | update on living situation & xfer to so VA      |
| requesting lab results  | update on symptoms: pain                        |
| requesting name of PT worked w/previously                                   | update rx                                       |
| requesting refill   | update to new provider on rxs currently taken   |
| requests CT scan  | urgency   |
| requests imaging procedure  | verification                                    |
| 3 requests labwork  | verifying lab times                             |
| requests labwork prior to next visit  | verifying receipt of flu vaccine                |
| requests NF Rx  | Viagra not working                              |
| requests notes for migraines to use FMLA                                    | wants access to gym                             |
| requests Rx acetaminophen   | 2 wants appt                                    |
| requests Rx for gut   | wants dates of vaccinations                     |
| requests Rx viagra  | wants flu vaccine                               |
| requests service dog  | wants gym access                                |
| requests vaccine  | wants handicapped sticker                       |
| responding to call from nurse   | wants info from provider on suggested procedure |
| 19 response to provider message   | wants info on vaccine                           |
| return of paper Rx  | wants lab results                               |
| review of current meds  | wants new microwave                             |
| review of meds  | wants paperwork completed                       |
| review of Rx  | wants penile implant                            |
| Rx lost in mail?  | wants PT outside of VA                          |
| sad emoticon  | wants return call from provider                 |
| send for 3 mos  | wants Rx thru VA if there's not deductible      |
| sending message to one provider to encourage another provider to utilize SM | wants stronger pain meds                        |
| sent RN to fill outside pain Rx @ VA  | wants surgery at specific hospital system       |
| set up appt   | Wants test results                              |
| sharing pulse ox leads to unwanted findings                                 | wants to increase dose Rx                       |
| should he go ED or see MD?  | wants use of gym                                |
| 2 shrinking penis   | went outside system to get pain rx              |
| side effects p/viagra   | what to do?                                     |
| SOB   | why wasn't Rx written for vitamin               |
| soon to run out of Rx   | will mail disability forms to provider          |
| sore throat   | wondering if wrong lab results delivered to pt  |
| 7 squeeze in appointment  | worried about fam hx of diabetes                |
| start vit D   | worry   |
| stopping prednisone   | would be avail to be seen                       |
| suggests increasing # pills for next script                                 | would like to quit statins                      |



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| symptoms - growth                              | wound dry  |
| symptoms - rectal bleeding                     | writes in anticipation of future visit                     |
| symptoms back pain/?clot                       | wrong dme ordered/received                                 |
| symptoms continue                              | wt gain  |
| symptoms kidney stone                          | 2 update on condition: worse or same                       |
| symptoms of URI                                | update on condition: worse re: bs                          |
| symptoms of yeast inf                          | update on condition: worse, cramping in le                 |
| symptoms sore throat                           | update on condition: worse, macular degen                  |
| symptoms URI w/CHF                             | update on condition: worse, sore on thigh                  |
| 3 symptoms UTI                                 | 25 update on consultant appt                               |
| symptoms with new Rx                           | 18 update on consultant appt - outside system              |
| 4 symptoms, new                                | Update on job position                                     |
| symptoms: confusion                            | update on life   |
| 2 symptoms: cough                              | Update on meds currently taken                             |
| symptoms: gout                                 | update on outside Tx                                       |
| symptoms: nosebleed/? BP elev                  | update on upcoming appts                                   |
| symptoms: pain in ankle                        | Update to lab info from outside lab                        |
| symptoms: pain increases                       | update/appts   |
| symptoms: tennis elbow                         | urging prov thru peer pressure to increase gabapentin dose |
| 6 symptoms, report on                          | verifying flu shot need                                    |
| takes oxycodone                                | verifying new Rx   |
| 17 thanks                                      | viagra giving h/a nausea                                   |
| thanks for med                                 | vision decreasing  |
| thanks for ur time                             | wants approval to take OTC                                 |
| theory on government workers                   | wants appt   |
| 2 thinks Low T                                 | wants assistance at home                                   |
| to have surgery/procedure outside system       | wants f/u on labs done                                     |
| too busy to drive father this far              | wants food   |
| took self off of Rx                            | wants handicapped sticker                                  |
| transfer all Rx to VA                          | wants help at home   |
| Treatment of h/a                               | wants info on recent labs                                  |
| treatment of scabies                           | wants job at Va  |
| trouble submitting spec                        | wants lab test prior to appt                               |
| uncertain if needs upcoming appointment        | Wants new wt loss rx                                       |
| uncertain of charges for medical care p/age 65 | wants penile band/ring                                     |
| uncertain of f/u w/consultant                  | wants provider to talk to therapist                        |
| 2 uncertain of lab results                     | wants results test/procedure                               |
| uncertain of plan of care                      | wants Rx amicar (antifibrinolytic)                         |

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| uncertain over Rx to take                          | wants steroid inj knee                         |
| uncertainty re: correct BP meds                    | wants stronger Rx muscle relax and anti-in     |
| unhappy w/Milw bill                                | wants target wt                                |
| unsure of med protocol in prep for cardiac surgery | wants test results                             |
| update   | wants to walk in to derm clinic                |
| update on accident                                 | warning of lack of support                     |
| update on blood glucose results                    | went to ED for fill                            |
| 24 update on condition                             | who should regulate diabetes?                  |
| update on condition and worse symptoms             | will f/u w/consult                             |
| 3 update on condition: better                      | wondering if labs should be done prior to appt |
| 2 update on condition: constipated                 | worry  |
| update on condition: gout or sprain hand           | would like to change meds                      |
| 14 update on condition: improved                   | would like to switch to tramadol               |
| update on condition: itching                       | writes in anticipation of future visit         |
| update on condition: not resolved                  | wrong diabetic supplies sent                   |
| update on condition: pain increasing               | wrong medications sent                         |
| 16 update on condition: worse                      |  |

**Claudia S. Derman**  
**University of Wisconsin, Milwaukee**  
**December, 2014**

**Education**

University of Wisconsin, Milwaukee, WI

**Doctor of Philosophy in Nursing** **2014**

Dissertation: "Use of Secure Messaging by U.S. Veterans and Significant Others"

Northern Illinois University, DeKalb, IL

**Master of Science, Nursing** **1988**

College of St. Teresa, Winona, MN

**Bachelor of Science, Nursing**

**EMPLOYMENT EXPERIENCES**

*Supervisor, Nursing Informatics*

James A. Lovell, FHCC

North Chicago, IL

2009 – present

Responsibilities include

Development and maintenance of EHR for the first joint VHA/DoD Federal Health Care Center in the country. Work with developers to assure joint accuracy of VHA and DoD medical records. Work with staff and administrators to ensure ongoing development and functionality of electronic health record. Supervise and teach departmental and hospital-wide staff.

*Clinical Applications Coordinator*

VAMC Iron Mountain

Iron Mountain, Michigan

1995 – 2009

Responsibilities included:

All aspects of the electronic medical record; testing of hardware, software, system parameters, implementation of system and its related components, education of staff. Large software product implementation (record scanning, patient electronic signature, digitized radiology system). Design and writing of order sets and standing orders, documentation review, quality review of system. Discussion with administrators, managers and staff to improve use and quality of system and review of current aspects. Plan for future projects. Held classes for all staff on basics of computers, word processing and spread sheet program for beginning, intermediate and advanced levels of each course. Responsible not only for Iron Mountain campus but also for six community based clinics (e.g. Sault St. Marie, Ironwood) which require physical presence on an ongoing basis.

***Instructor***

Lake Superior State University

Escanaba, MI

2000

Taught one semester of Healthcare and Computers

***Chair, Pembine, Dunbar, Beecher Rescue Squad 2003-2009******EMT, Pembine, Dunbar, Beecher Rescue Squad***

1996-2009

Responsibilities included maintaining a licensed and state accredited agency of 25-35 volunteer EMTs and volunteer ambulance drivers in rural Wisconsin.

Problem solving and counseling of staff. Monthly meetings, writing of policies and procedures. Maintenance of own licensure. Patient care in unknown situations. One of only two volunteer staff with professional healthcare background.

***Clinical Director***

Clinical Support and Development

The Glenbrook Hospital

Glenview, Illinois

1989 – 1995

Responsibilities included

Planning, implementing, and evaluation of all programs and personnel within each, as well as four cost centers and related budgeting processes, personnel and supplies) for the following areas:

Quality Management and JCAHO preparation – Department of Nursing, Patient Classification, Nursing Research and Publications. Orientation and Education of all Department of Nursing Personnel, Patient Education, Medical Library, Special Support Programs, Fetal Diagnostics, Healthwatch Program, Nursing Information Systems. Also supervision of, Nurse Practitioners, Supervisors, Center for Plastic and Aesthetic Surgery, Continuity of Care Department, Management of Nursing Office.

***Clinical Coordinator***

Same Day Surgery Unit

The Glenbrook Hospital

1985-1989

Responsibilities included:

Physical design and layout of unit, start-up of new unit including publicity in house and in community, growth of unit from 2 patients per day to more than 18 patients per day, all personnel related issues, greater than \$2 million dollar budget, start-up of nursing component of In Vitro Fertilization Program, house-wide implementation and maintenance of Medicus Patient Classification System.

***Clinical Coordinator***

Orthopaedic Unit

The Glenbrook Hospital

1978-1985

Responsibilities included:

Start-up of new unit: personnel and supplies, unit growth from six to thirty six patients, greater than \$1.5 million annual budget, national presentation of AHA Nursing teleconference “The Head Nurse’s Role in the Budgeting Process.” (Unit closed 1985, as Orthopaedics became an outpatient service.)

*Staff Nurse*

Orthopaedic Unit  
Northwest Community Hospital  
Arlington Heights, Illinois

**PROFESSIONAL DATA**

R.N. Licensure: Illinois, Wisconsin, Michigan,  
Current to 2014

Chair, Pembine-Dunbar-Beecher Rescue Squad 2002-2009

Emergency Medical Technician, State of Wisconsin  
Current to 2009

Chair, Pembine-Dunbar-Beecher Rescue Squad Board of Directors

Past Vice President, Organization of Nursing Doctoral Students, University of  
Wisconsin, Milwaukee 2006

Past Secretary, Orthopaedic Nurses’ Association  
Northwest (Illinois) Suburban Chapter,

Member: Chicago Metropolitan Nursing Education Organization (CMNEO)  
1989-1995