

EXPLORING PERCEPTIONS OF HEALTHCARE PROVIDERS USE OF  
ELECTRONIC ADVANCE DIRECTIVE FORMS IN ELECTRONIC HEALTH  
RECORDS

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A Dissertation presented to  
The Faculty of the Graduate School  
at the University of Missouri

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy

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by  
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July, 2017

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EXPLORING PERCEPTIONS OF HEALTHCARE PROVIDERS USE OF  
ELECTRONIC ADVANCE DIRECTIVE FORMS IN ELECTRONIC HEALTH  
RECORDS

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## **DEDICATION**

This Dissertation Research is dedicated to my husband, Michael Folarinde, and my children, Blessing and Busayo. I could not have completed this program without your support and prayers. This project is also dedicated to my parents, Ms. Titilayo Samuel and Blessing Tuwatimi.

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ABSTRACT

**Background:** Advance directives (ADs) are documents that allow competent individuals to set forth their medical treatment wishes and/or to name a proxy in the event that they lose the capacity to communicate these decisions in the future. Technology has remained an important driver of change for centuries; the electronic health record (EHR) has evolved as an important facilitator in patient care processes and the implementation of electronic ADs in an EHR is no exception. The integration of ADs into EHRs is one of the means that has been improvised to improve instant accessibility of AD documents for healthcare providers. Although healthcare providers' perception of electronic ADs in EHRs can greatly impact its usability, little or no study has been conducted using Technology Acceptance Model constructs to explore perceptions of providers' use of electronic ADs.

**Aim:** The aim of this study is to explore the perception of healthcare providers' use of electronic AD forms in the EHR in terms of perceived usefulness, perceived ease of use, and behavioral intention to use, and to measure impact on actual system usage. This study also examined existing relationships among the participants' demographics and the research variables described.

**Methods:** This study was guided by the Technology Acceptance Model (TAM) using a survey adapted from the TAM literature. A cross-sectional, correlational quantitative

design was utilized. The study was conducted in six departments at a public, academic healthcare system in the southern United States.

**Results:** Of the 165 surveys distributed, a total of 151 participants (92%) responded: 67% female (n = 101), 33% male (n = 50). Participants included physicians (n=78); staff nurses (n=57); nurse practitioners (n=4); social workers/case managers (n=6); administrators (n=1); and others (n=5). There was a moderately strong positive correlation between Perceived Usefulness and Actual System Usage ( $r = 0.70, p < 0.0001$ ). Likewise, Perceived Ease of Use and Actual System Usage had a moderately strong positive correlation ( $r = 0.70, p < 0.0001$ ). In contrast, the strength of the relationship between Behavioral Intention to Use and Actual System Usage was more modest ( $r = 0.22, p < 0.004$ ). In addition, the results of the Kruskal-Wallis H test found there was a statistically significant differences in the Actual System Usage of the electronic ADs among the 6 departments  $\chi^2(5) = 79.325, p < 0.000$ . Specifically, the Primary Care Clinics are highly significant with  $p = 0.0004$  for Behavioral Intention to Use and  $p < 0.0001$  for Perceived Usefulness and Perceived Ease of Use compared to others. There were not significant relationships between the participants' demographics and the research variables.

**Conclusion:** The relationships among primary TAM constructs found in this research are largely consistent with those typical in previous TAM research, with the exception of the Behavioral Intention to Use, which is slightly lower. These data suggest that the healthcare providers' perception has great influence on the usage of the electronics ADs. However, this study lacks generalization because it was conducted in few departments at

a single hospital. Therefore, it is recommended that the future researchers conduct a similar study in a larger scale and, if possible, across different types of EHRs.

# **CHAPTER ONE**

## **Introduction**

### **Definition of Advance Directives**

Advance directives (ADs) are documents that allow competent individuals to set forth their medical treatment wishes and/or to name a proxy in the event that they lose the capacity to communicate these decisions in the future (Ni et al., 2014).

### **Types of ADs**

ADs are different depending on the laws and legal requirements of each state. There are two major types of ADs including the living will and the durable power of attorney for health care, which is sometimes called the health care power of attorney or health care proxy (Ni et al., 2014). A living will is a document designed to control certain future health care decisions only when a person becomes unable to make decisions and choices on their own (American Cancer Society [ACS], 2015). A durable power of attorney for health care is also called a health care power of attorney. It is a legal document in which a person names another person to be their proxy (agent) to make all their health care decisions if they become unable to do so (ACS, 2015).

### **ADs in the Era of Technology**

Technology has remained an important driver of change for decades (Sharma & Chandel, 2013). The previous two decades have witnessed numerous significant innovations and developments in the area of information and communication technology in healthcare. The electronic health record (EHR) has evolved as an important facilitator in patient care processes and the implementation of electronic AD is not an exception. In this research, EHR is defined as an electronic version of a patient's medical history, that

is maintained by the provider over time, and may include all of the key administrative clinical data relevant to a person's care under a particular provider, including demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports (Centers for Medicare and Medicaid Services [CMS], 2012). Electronic ADs also provide relevant clinical data for a person's care including what a person's desires are for treatment at the end-of-life (EoL). ADs may be integrated into the EHR as electronic forms that are completed by patients and nursing staff during patient assessments or the ADs may be scanned from a previous paper copy and stored in the EHR for later use. However, in this project, electronic ADs referred to the AD forms that were scanned and stored in the EHR.

Following the mandatory implementation of EHR by the U.S. government and incentives provided by President Obama and his administration as part of the Meaningful Use program many healthcare organizations evolved from paper chart to EHR (HealthIT.gov, 2009). Subsequently, EHR usage has increased dramatically. According to Centers for Medicare & Medicaid Services (2016a), more than 506,000 health care providers have received payment for participating in the Medicare and Medicaid EHR Incentive Programs. More than eighty percent of the hospitals have demonstrated meaningful use of EHRs. Moreover, effective January 1, 2016, the Centers for Medicare and Medicaid Services (2016b) has begun providing financial reimbursements to providers when advance care planning services are provided as a part of an annual wellness visit.

## **Benefits of EHR**

EHR systems have been widely adopted around the world and have become an important tool for daily medical practices and health care management of patients (Shield et al., 2010). Implementation of EHR has been reported to offer improvements in the quality, efficiency and safety of health care services (Chao, Hu, Ung, & Cai, 2013), hold considerable promise for preventing harmful medical errors and associated malpractice claims (Mangalmurti, Murtagh, & Mello, 2010), and promote complete documentation and timely access to patient information, facilitating sound clinical decision making (Chao et al., 2013). For example, availability of ADs and code-status in EHR help to create a ready reference for care providers and facilitates smoother transition of patient care (Bhatial et al., 2015). The empirical evidence suggests that comprehensive EHR systems can improve adherence to clinical guidelines and reduce rates of medication errors (Mangalmurti et al., 2010).

Furthermore, access to EHR may also reduce geographical barriers to patient care and act as a point of record integration, particularly in fragmented health systems, thus improving continuity of care and efficiency (Latha, Murthy, & Sunitha, 2012). EHR improves the accuracy, efficiency and quality of data recorded in a health record; enhances healthcare practitioners' access to information enabling it to be shared by all (Latha et al., 2012). An EHR improves the quality of care as a result of having health information immediately available at all times for patient care (Latha et al., 2012). Other benefits of EHR include compliance, completeness of records, decision support, accurate billing, and even returns on investment (Latha et al., 2012).

## **Challenges of EHRs**

Multiple barriers to implementing EHRs have been reported (Chao et al., 2013). Lack of standards for recording clinical information, high implementation and maintenance costs, clinical and financial benefits not relevant to physicians in ambulatory care, concerns about violation of privacy and confidentiality by the patients, concerns about legal liability by the physicians are among the various obstacles to universal adoption (Chao et al., 2013). Moreover, potential benefits of EHRs are often offset by the need for continuous financial input to maintain and improve the system. In addition to the many unsolved issues, there are already additional functions in need of more attention, such as interoperability between different EHRs allowing medical information exchange across hospitals to be possible (Chao et al., 2013). Also, fuller access to electronic patient information may tempt providers to rely on previously recorded patient histories, test results, and clinical findings rather than collect new information (Mangalmurti et al., 2010). Additionally, overreliance on the copying and pasting function of many documentation systems can also perpetuate earlier mistakes (Chao et al., 2013).

## **Background of the Study**

ADs are written instructions that are intended to reflect a patient's wishes for health care to guide medical decision-making in the event that a patient is unable to speak for her/himself. ADs typically result from advance care planning and often take the form of a living will, which defines the medical treatment that a patient prefers if they are incapacitated, or a patient may designate someone as a medical power of attorney (Jones, Moss, & Harris-Kojetin, 2011). ADs fall under state regulation, and the required forms

for formal ADs vary from state to state, creating a problem for standardization (National Institute on Aging [NIA], 2014).

Studies have found that about 4 in 10 Americans ages 65 and older do not have ADs or have not written down their own wishes for EoL medical treatments (Pew Research Center, 2013). Additionally, demographic differences appear to play a role in the likelihood of having ADs (Zaide et al., 2013). Specifically, African Americans and Hispanics have ADs at lower rates compared to whites, as do people with lower incomes and lower levels of completed education (Nicholas, Langa, Iwashyna, & Weir, 2011). Researchers have identified several factors that contribute to these differences, including cultural and religious differences, communication challenges between patients and medical staff, distrust of medical care systems, and lack of awareness of AD options (Johnson, Kuchibhatla, & Tulsky, 2008).

The Patient Self-Determination Act (PSDA), which took effect in 1991, included a list of Medicare requirements for health care facilities regarding ADs (U. S. Omnibus Budget Reconciliation Act, 1990). Under this law, facilities such as hospitals and skilled nursing facilities must ask each patient upon admission if he or she has an AD and record its existence in the patient's file (Jones, Moss, & Harris-Kojetin, 2011; U. S. Omnibus Budget Reconciliation Act, 1990). The PSDA requires that patients are given written notice upon admission to a variety of health care institutions of their decision-making rights and policies regarding advance health care directives (U. S. Omnibus Reconciliation Act, 1990). Recent surveys show that among long-term care patients, those receiving care in a facility (such as a nursing home or hospice facility) are more likely to have ADs in place (Jones et al., 2011).

The right to self-determination is fundamental in clinical ethics. EoL conversations and ADs have been shown to decrease the likelihood of in-hospital death, improve the quality of care, and lower health costs in the final week of life (Hayek et al., 2014). Several studies have demonstrated widespread support of ADs among both physicians and patients, and recently, researchers have reported several promising interventions to promote execution of ADs, which include incorporation of ADs into the EHR (Hayek et al., 2014; Lindner et al., 2007). Another study using retrospective analysis of survey data found that patients who died with ADs documented in charts received care strongly aligned with their preferences and patients with living wills or those who had a health care proxy were statistically significantly less likely to receive aggressive care than those without ADs (Silveira, Kim and Langa, 2010). Patients with terminal illnesses and their families' desire for information about patient preferences at EoL to be considered in preparation for death are an important aspect of care (Temel et al., 2013).

Achieving concordance between patients' EOL care preferences and the care they received is a high priority in health care (Dy et al., 2010). Improving communication about patient preferences and documentation of patient preferences is important to prevent unnecessary and unwanted acts of care (Hayek et al., 2014). Errors such as resuscitation in a patient who wanted comfort care because the correct documentation had not been completed can cause unnecessary, significant harm and suffering for patients and families (Dy et al., 2010).

Researchers have found that patients want to speak with their physicians about ADs and the lack of an association between advance directive status and death (Fischer,

Min, & Kutner, 2010; Mahon, 2011); that families in which a member died with an AD had less stress, depression, and anxiety (Detering, Hancock, Reade, & Silvester, 2010); and that ADs led to greater consistency between patient preferences and the care received (Silveira, Kim, & Langa, 2010). Other researchers also have found that although discussions about patient preferences and the benefit of specific interventions at the EoL did change the treatments provided, patients did not die sooner, and significant cost savings were accrued (Mahon, 2011; Morrison, 2010; Temel et al., 2010). Respect for an individual's autonomy is often described as the principle underlying the appropriate use of ADs and the intent to apply the principle and the regulations has not led to a widespread utilization of ADs (Mahon, 2011). Patients often do not discuss their wishes regarding EoL care with their family members prior to the time of a critical illness or traumatic event, however, the time of a critical illness or traumatic event is difficult for all involved in the care of the patient (Donahue, 2013). Donahue (2013) also found that the healthcare providers want to honor the wishes of the patient; the family members want their loved one to live on; none involved want to cause pain and/or harm to the patients.

### **Statement of the Problem**

Unwanted EoL healthcare services can have a significant emotional and financial impact on patients and their families. It's estimated that \$40 to \$70 billion in unwanted healthcare services will be delivered at patients' EoL in the next decade (Khandelwal & Curtis, 2014). Up to this point, patients completed the AD on paper and submitted it to their physician to be filed away in clinic documentation; as a result, the instructions were not accessible by all providers and were left open to interpretation from doctor to doctor.

Unless communicated in advance, many medical treatments provided at the EoL might be inconsistent with patients' wishes. It is important to recognize the use of technology to enable and support conversations about EoL (Galambos, Starr, Rantz, & Petroski, 2016).

Aside from cost, several other factors contribute to difficult clinical discussions about whether patients are getting the care they want or need as they approach the end of their lives. Research has found, for example, that most adults (90 percent) say they would prefer to receive EoL care in their home if they were terminally ill, yet data show that only about one-third of Medicare beneficiaries (age 65 and older) died at home (Teno et al., 2013). In 2016, Medicare began covering advance care planning, discussions that physicians and other health professionals have with their patients regarding EoL care and patient preferences as a separate and billable service (Kaiser Family Foundation, 2016). Lack of availability and easy accessibility to patients' ADs could account for low usage and execution of ADs for patients which can lead to providing care not consistent with patients' wishes and dishonoring their preferences for EoL care.

Several studies have been conducted on the use of various interventions to improve the discussion and documentation of ADs; exploration of physicians' perceptions on the ADs; and patients' perceptions on ADs as discussed in chapter two. Although healthcare providers' perception of electronic ADs in EHRs can greatly impact its usability, little or no study has been conducted using Technology Acceptance Model constructs to explore perceptions of providers' use of electronic ADs among the interdisciplinary team (nurses, social workers, case managers, and physicians). This means that little or no research has been found which assessed the usefulness, ease of use,

and the intentions of healthcare providers towards the use of electronic ADs, which specified patients' EoL preferences.

### **Purpose of the Study**

The overall purpose of this research study was to explore perceptions of healthcare providers (physicians, nurses, case workers, and case managers) who are working at Grady Health System on the use of electronic ADs in the Epic EHR. The healthcare providers' perceptions regarding the use of electronic AD forms in the Epic EHR will be assessed in terms of perceived usefulness (PU), perceived ease of use (PEOU), and behavioral intention to use (BIU) towards actual system usage (SU). PU, PEOU, BIU, and SU are constructs included in the well-known TAM developed by Davis (1989) as described below.

### **Specific Aims and Research Questions**

The specific aims and the research questions are listed below.

**Specific aim 1.** To determine the extent to which PU is associated with the SU of electronic ADs.

**Research question 1.** Are there associations between the PU and the SU of electronic ADs?

**Research hypothesis.** H1: PU will have significant positive correlation with the SU of the electronic ADs.

**Specific aim 2.** To determine the extent to which PEOU is associated with the SU of electronic ADs.

**Research question 2.** Are there associations between the PEOU and the SU of electronic ADs?

**Research hypothesis.** H2: PEOU will have significant positive correlation with the SU of the electronic ADs

**Specific aim 3.** To determine the extent to which BIU is associated with the SU of electronic ADs.

**Research question 3.** Are there associations between the BIU and the SU of electronic ADs?

**Research hypothesis.** H3: BIU will have significant positive correlation with the SU of the electronic ADs.

**Specific aim 4.** To examine the differences in the PU, PEOU, and BIU towards SU of the electronic AD among the six departments.

**Research question 4.** Are there differences in the PU, PEOU, and BIU towards SU of the electronic AD among the six departments?

**Research hypothesis.** Mean differences of PU, PEOU, and BIU towards the SU of the electronic ADs will exist among the six departments.

**Specific aim 5.** To examine the associations among the participants' demographics and the research variables.

**Research question 5.** Are there associations among the participants' demographics and the research variables?

### **Significance of the Study**

Medical orders are associated with better patient quality of life when patients' goals of treatments are readily available to medical providers and actions to be taken are clearly reflected, as is the case when patients who do not desire resuscitation complete a do-not-resuscitate (DNR) order (Garrido, Balboni, Maciejewski, Bao, & Prigerson,

2015). Additionally, electronic ADs in the EHR create a readily available reference for care the providers (Bhatial et al., 2015). Readily and accessible ADs can improve the usage and compliance with executions of these documents, thereby improving the quality of EoL care and honoring patients' preferences (Wilson et al., 2013).

### **Limitations and Assumptions**

There are some assumptions made in this study and these are enumerated below.

- EPIC EHR will promote and facilitate access to patients' ADs more quickly.
- Patients have scanned copy of AD forms in the EPIC EHR.
- Healthcare providers have the resources and competence to effectively utilize EHR.
- Healthcare providers know where the electronic ADs are stored in the EPIC EHR.
- Healthcare providers know how to access the electronic ADs in the EPIC EHR.

### **Definition of Terms**

**Advance directives (ADs).** ADs are legal documents that allow patients to spell out their decisions about end-of-life care ahead of time. ADs give patients a way to provide their wishes to family, friends, and health care professionals and to avoid confusion later on at the end of their life.

**Living Will.** A living will tells which treatments patients want if they are dying or permanently unconscious. In the living will, patients can accept or refuse medical care. Patients might want to include instructions on: the use of dialysis and breathing machines, if they want to be resuscitated if they are unable to breathe on their own or their heart stops beating, administering tube feeding, or organ or tissue donation.

**Durable Power Of Attorney for Health Care.** A durable power of attorney for health care is a document that names your health care proxy. Your proxy is someone you trust to make health decisions for you if you are unable to do so.

**Electronic ADs.** Electronic ADs are the AD forms that were scanned and stored in the EHR.

**End-of-Life (EoL).** End-of-life care is the term used to describe the support and medical care given during the time surrounding death.

**Quality of Life (QoL).** The term Quality of Life is often used at a time when patients, families and health care professionals are trying to understand the impact of a serious illness. There are two key concepts associated with Quality of Life: (a) It is multi-dimensional and includes physical, social, psychological and spiritual dimensions, (b) It can only truly be determined by the patient.

**Electronic Health Record (EHR).** An EHR is an electronic version of a patients' medical history that is maintained by the provider over time, and may include all of the key administrative clinical data relevant to that persons care under a particular provider, including demographics, progress notes, problems, medication (Centers for Medicare & Medicaid Services [CMS], 2012).

**Perceived Usefulness (PU).** The degree to which a person believes that using a particular system would enhance his or her job performance

**Perceived Ease of Use (PEOU).** An individual's perception that using an IT system will be free of effort.

**Behavioral Intention to Use (BIU).** An individual's motivation or willingness to exert effort to perform the target behavior

**Adverse Events.** Adverse events are any undesirable effects that the patient may experience during their course of treatment.

**Electronic charting:** the ability to document all aspects of patient care into an EHR.

**Paperless documentation.** The use of EHR to document and communicate all aspects of patient care without the use of any paper charting system.

### **Chapter Summary**

This chapter provided a general overview of what the AD is, its importance and the use of ADs in the EHR. This chapter also discussed the study purpose, specific aims, research questions as well as the hypotheses. Finally key terms that were used in this paper were defined. The importance of having ADs readily available in the EHR cannot be overemphasized; it can foster easy and faster retrieval of such documents for execution when needed. Knowing the perceptions of key users of the electronic ADs, which are physicians, nurses, case workers, and case managers in this case is very essential.

Chapter two will provide review of related literature about ADs and the use of EHR to improve documentation of ADs as well as the theoretical model guiding this research study. Chapter three will discuss the research methodology including the design, sampling, and statistical analysis as well as the plan for human subjects. Chapter four will include the findings from the study. Finally, chapter five will elaborate on the research findings and limitations of the study; provides recommendations for future research, as well as overall summary of the clinical implications of the results of this research project.

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## CHAPTER TWO

### **Review of Related Literature and Conceptual Framework**

The purpose of chapter two is to provide a review of the related literature on advance directives (ADs) and the impact of technology on its documentation. This review focuses on the following topics of interest: benefits of ADs, perceptions and barriers to AD documentation, ethical considerations in ADs, approaches for improving discussion and documentation of AD, and challenges in the documentation of ADs in the EHR.

Advance directives have been widely promoted as a mechanism to guide families toward decisions similar to those an incapacitated relative would have made, had he/she still been able to decide. Use of an AD helps people clarify and communicate their values, beliefs and preferences for future care in the event of impaired decisional capacity (Bravo et al., 2012). ADs may or may not be conveyed in writing. Written ADs for health care are documents in which capable individuals specify their preferences regarding treatment and/or designate a trusted relative or friend to eventually make decisions for them should they lose the ability to express themselves (Bravo et al., 2012). This chapter also discusses conceptual frameworks underpinning this study. The study framework hypothesizes a link among perceived usefulness, perceived ease of use, and behavioral intention to use the electronic advance directives in the EPIC EHR.

#### **Benefits of ADs**

The merits of completing ADs have received significant emphasis over the past several years. Proposed advantages include increased patient autonomy in end-of-life care (EoL) decisions, clarification of patients' preferences for EoL care to ensure care consistent with patients' goals and values, and the possibility of reduced costs of EoL

care because patients often prefer limits on aggressive care (Galambos, Starr, Rantz, & Petroski, 2016; Hayek et al., 2014; Sudore & Fried, 2010). Patients with terminal illnesses and their families' desire for information about patient preferences at EoL to be considered in preparation for death is an important aspect of care (Temel et al., 2013). An observational study revealed that patients with ADs in charts or related documents are more likely to receive care consistent with their EoL preferences (Hickman, Lipson, Pinto, & Pignatiello, 2014). Another retrospective analysis of survey data found that patients who died with ADs received care strongly aligned with their preferences and patients with living wills or who had a health care proxy were statistically significantly less likely to receive aggressive care than those without ADs (Silveira, Kim, & Langa, 2010). Despite the fundamental importance of ADs, most medical institutions lack effective documentation tools (Yung, Walling, Min, Wenger, & Ganz, 2010).

### **Ethical Considerations in ADs**

The care of an older adult with a serious or potentially fatal disease begins with the onset of symptoms and continues until the patient is in remission or cured, or until the patient dies. Ideally EoL decisions are made early in the process, before they are needed (National Cancer Institute [NCI], 2011). Due to the sensitive nature of these decisions, there is often a conspiracy of silence that delays or prohibits discussion. Patients do not want to worry their families, and families are afraid that EoL discussions will cause the patient to become depressed or give up. Physicians often feel uncomfortable with these discussions and do not want to worry the patient or family. So EOL discussions are often delayed until patients are incapable of making their wishes known and, when the end

nears, the issues remain unresolved and decisions are often made by people who may not know the patient's desires (NCI, 2011).

In a study by Mollberg et al. (2011), researchers evaluated the consequences of violating current guidelines regarding the resuscitation of patients in pre-hospital traumatic arrest and whether emergency medical services personnel were able to accurately identify patients in traumatic cardiopulmonary arrest. Retrospective review of database was conducted over an 8-year period (January 1, 2003, to December 31, 2010). The findings revealed that emergency service personnel were able to accurately determine traumatic cardiac arrest in the field. Violation of the current guidelines resulted in 6 patients being resuscitated to a neurologically devastated state. Four declared brain dead, one patient's family requested withdrawal of care due to medical futility, and 1 discharged to a long-term care center with a Glasgow Coma Scale score of 6 which indicates severe brain injury. Resuscitation of these patients meeting criteria for withholding or termination of resuscitation resulted in \$3,852,446.65 worth of hospital charges.

### **Healthcare Providers Perceptions and Attitudes toward ADs**

This research study focuses on exploring perceptions of healthcare providers perceived usefulness, perceived ease of use, and behavioral intention to use the electronic ADs in the EHR. Studies such as Neuman and Wade (1999); Burkle, Mueller, Swetz, Hook, and Keegan (2012); Coleman (2013); and Haras, Astroth, Hesson-McInnis, Woith, and Kossman (2015) have found providers' perceptions and attitudes toward ADs as discussed below.

Neuman and Wade (1999) explored the perceptions of health care providers across the continuum of care as to how effective AD arrangements were in assuring compliance with the patients' wishes, as well as their overall satisfaction levels with the process. The health care providers who responded to the survey indicated high levels of overall satisfaction with AD, despite low patient completion rates and, most significantly, low confidence levels that surrogate decision making accurately reflected the patient's wishes. The authors also performed a secondary analysis comparing the perceptions of health care providers with consumers' reasons for failing to complete AD. The need for further education was perceived as a primary need by the health care professionals, but not by the consumers.

Van Dorn et al. (2006) explored perceptions of potential barriers to the effective implementation of ADs among 591 mental health professionals (psychiatrists, psychologists, and social workers). The authors found barriers among three professional groups related to operational features of the work environment (e.g., lack of communication between staff, lack of access to the document) were reported at a higher rate than clinical barriers (e.g., inappropriate treatment requests, consumers' desire to change their mind about treatment during crises). In multivariable analyses, legal defensiveness, employment in public sector mental health services, and a belief that treatment refusals will outweigh the benefits of ADs were associated with more perceived barriers, whereas age and endorsing positive perceptions of ADs were associated with fewer perceived barriers. Also, the study showed that psychiatrists, psychologists, and social workers tend to perceive significant potential barriers to ADs, related to operational aspects of these professionals' work environment as well as certain clinical

features of ADs for persons with severe mental illness. Additionally, legal defensiveness and general endorsement of ADs appear to shape perceptions of barriers to the effective implementation of ADs.

Coleman (2013) carried out a literature review on physician's attitudes as well as the variables that may impact physicians' attitude toward ADs. The author reviewed 17 published articles, covering the period 1989 to 2011 and found that physicians have a positive attitude toward patients' ADs. Also, research studies have shown that providers' perception can have negative or positive effects on the completion rate of ADs. For instance, some of the findings in a study conducted by Burkle et al. (2012) revealed that some providers indicated that they were likely to honor a patient's AD; some will would honor the AD of a patient in ventricular fibrillation who had expressed a desire to "pass away in peace; few admitted they would forgo an AD following a family's request for continued resuscitative treatment. The majority (52%) in Burkle et al. (2012) research indicated they would consider risk of liability to be lower when maintaining someone alive against their wishes, rather than mistakenly failing to provide resuscitative efforts.

Haras et al. (2015) provide an overview on the process of testing and validating an instrument to measure nephrology nurse perceptions toward advance care planning and information on nephrology nurses' perceptions of advance care planning. In this instrument validation study, comfort in conducting and participating in advance care planning discussions was the most critical dimension determining nephrology nurse perceptions toward advance care planning. Knowledge of and administrative support for advance care planning were important dimensions that contributed to nurses' overall perception toward advance care planning. Attitude toward advance care planning was

important but had a lesser role in determining nephrology nurse involvement in advance care planning discussions with persons with chronic kidney disease. Educational resources to increase knowledge are plentiful; combined with a supportive environment, nephrology nurses will have the necessary structural components in place to improve the process of advocating and participating in advance care planning discussions with persons with chronic kidney disease.

### **Approaches for Improving AD Documentation Rates**

In the course of this review, a number of studies found that EHR-based interventions increased documentation and execution of ADs (Heiman, Bates, Fairchild, Shaykevich, & Lehmann, 2004; Lindner, Davoren, Vollmer, Williams, and Landefeld, 2007; Temel et al., 2010; Febretti et al., 2014; Hayek et al., 2014; Cutrona et al., 2016). Also, email reminders to providers have proven to be effective in improving AD documentation rates (Temel et al., 2013). This section discusses summary of these studies. However, it is important to note that perceptions of the healthcare providers use of the EHR-based interventions to improve accessibility and execution of ADs in term of their perceived usefulness, ease of use, and behavioral intention to use can greatly impact the actual execution of the ADs, which is the focus of this current study.

**Uses of Clinical Decision Support to Improve Documentation of ADs.** The use of EHR-based reminder for providers and other healthcare professionals have been proven to have positive impacts on improving AD discussion and completion rates (Cutrona et al., 2016). A study conducted by Febretti et al. (2014) revealed that well-designed clinical decision support (CDS) interfaces available to nurses at the point of care influence care plan changes that may yield better patient outcomes. In a study

conducted by Hayek et al. (2014), investigators assessed the effectiveness of an EHR-based reminder in improving AD documentation rates. A prospective quality improvement study was conducted in outpatient clinics using the EPIC EHR to implement a reminder system consisting of the addition of an AD counseling module. The results found that EHR-based reminders were effective in improving documentation rates of ADs. Lindner et al. (2007) conducted a study to develop an EHR intervention to improve documentation of patient preferences about life-sustaining care, detail of resuscitation, treatment-limiting orders, and patient preferences. This studies design was a prospective before–after intervention trial. The results showed that EHR intervention increased documentation of AD discussion notes in seriously ill patients, also increased the frequency of DNR orders and orders to limit other life-sustaining treatments.

**E-mail Reminders.** E-mail reminder may improve the rate and timing of code status documentation. Also, the use of email reminders to providers can provide a mechanism to improve AD documentation rates. In a study conducted by Temel et al. (2013), brief e-mail prompts, timed to critical decision points in treatment and designed to encourage clinicians to discuss and document patients’ resuscitation preferences in the outpatient EHR, improved the rate and timing of code status documentation (Temel et al., 2013). More also, the use of email reminders to patients prior to patient visits through EHR portals can provide a mechanism to improve AD documentation rates as well.

### **Issues and Challenges in the Documentation of ADs in the EHR**

Although many interventions have been implemented in an effort to improve documentation and execution of ADs as discussed above, there are still some issues or challenges to overcome, some of which are discussed below. One of the challenges of

electronic ADs in the EHR identified by Wilson et al. (2013) in this section was the diversity in storage locations of scanned ADs in the EHR, making it difficult for the providers to easily access; however, the results of this current study showed high correlations between healthcare providers' perceived ease of use and the actual usage of the electronic ADs.

**Low Rate of AD Documentation in EHR.** Temel et al. (2010) assessed the rate of documentation of code status in the EHR of patients with metastatic cancer in a retrospective study. An electronic patient database in the EHR was queried to identify demographic information, cancer type, number of clinic visits, and documentation of code status from October 1, 2006 – February 29, 2008. The results showed that among the 2,498 patients, 20.3% had a documented code status. Younger patients and black patients were less likely to be designated as DNR. Despite the incurable nature of metastatic cancer, only a minority of patients had a code status documented in the EHR.

**Inconsistency in Documentation of ADs in EHR.** In another descriptive study, Yung, Walling, Min, Wenger, and Ganz (2010) assessed the flow of advance care planning information from patients to medical records in a community sample of older adults to better understand why advance care planning is not more successful. The authors conducted structured interview and medical record data from community-dwelling older patients in two previous studies. The study showed that community-dwelling elders' preferences for EoL care are not consistent with documentation in their medical records. EHRs and standardized data collection for EoL care could begin to ameliorate this problem. Also, Cohen-Mansfield, Libin, and Lipson (2003) conducted a study which clarified how AD are summarized in the patient's record and to clarify how

physicians perceive the same AD and formal orders among 122 elderly persons who reside in one large (587 beds) nursing home. The results of the study showed that the rates of documented AD found are higher than those reported in the literature. Also, the authors found higher rates of agreement between the information inside the chart and on the cover of the chart than between the Minimum Data Set and the other two sources. The author concluded that the reasons for discrepancies may lie in the different functions and procedures pertaining to these source documents.

**Multiple Locations of ADs in the EHR.** Another possible reason that poses a challenge to documentation of ADs has been attributed to lack of standardized location of the document in the EHR. Wilson et al. (2013) retrospectively reviewed EpicCare EHR records to identify the locations of AD documentation and determined which patient and primary care provider characteristics are associated with having a scanned document. Although, the results showed that patients' age, gender, race, illnesses, and when their physician started at the medical group were statistically significantly associated with the probability of having a scanned AD document; physicians in both the outpatient and inpatient settings have used a number of places in EpicCare EHRs to document discussions or decisions about ADs, including the problem list, progress notes, or as a scanned document under “encounter.” Such diversity in storage locations could make it difficult for physicians to retrieve this important information, especially under time constraints (Wilson et al., 2013). While the inaccessibility of ADs has been documented in the past, those studies usually used paper charts.

## Conceptual/Theoretical Framework

### Technology Acceptance Model

The Technology Acceptance Model (TAM) is an established tool that measures the usage and the acceptance of technology, attaining Cronbach's alpha reliability estimate of .97 for PU and .86 for PEOU (Davis, 1989). Davis developed the TAM to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while also being both parsimonious and theoretically justified (Davis, 1989). TAM cuts a wide theoretical swath which includes the adoption of innovations, the cost-benefit paradigm, expectancy theory, and self-efficacy theory (Davis, 1989). Davis's original TAM is shown in Figure I.

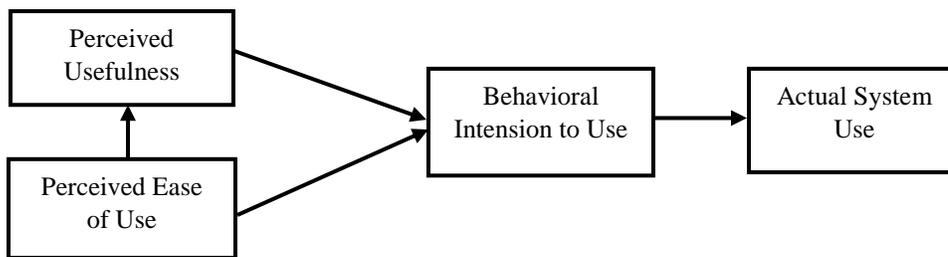


Figure 1: TAM (Davis). Adapted from Davis (1989).

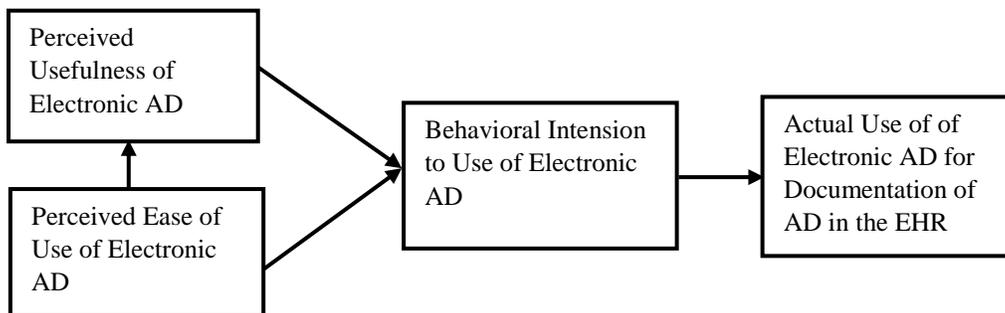


Figure 2: Research Model

TAM is derived from the theory of reasoned action model to explain a broader range of behaviors based on situation specific combinations of personal beliefs and

attitudes, and the effects of beliefs of others close to the individual. The fundamental premise of TAM is that individuals will adopt a specific behavior if they perceive it will lead to positive outcomes (Compeau and Higgins, 1995). TAM is theorized to apply to a broad range of information technologies. A significant and growing body of subsequent research has confirmed the usefulness of TAM and various extensions and revisions as a tool for investigating and predicting user information technology acceptance.

Additionally, TAM model had been adapted to study the acceptance of other clinical information systems. For instance, Ketikidis, Dimitrovski, Lazuras, and Bath (2012) applied a modified version of the revised TAM to assess the relevant beliefs, and acceptance of Health IT systems in a sample of health professionals (N = 133). Structured anonymous questionnaires were used and a cross-sectional design was employed. The findings showed that PEOU, but not usefulness, relevance and subjective norms directly predicted Health IT usage intentions. Also, Pai and Huang (2011) proposes a conceptual model, appropriate for the intention to use healthcare information systems, by adopting the system, service, and information qualities covered in the Information System Success Model proposed by DeLone and Mclean as the external variables and integrating the three dimensions of PU, PEOU, and intention to use in updated TAM. The analysis shows that the proposed factors positively influence users' intention to use a healthcare system. Information, service and system quality influence user's intention through the mediating constructs PU and perceived ease-of-use.

More also, Sachidanandam (2006) applied the TAM to study the perceived useful and easy to use of Computerized Physician Order Entry (CPOE) system among 100 physicians at a U.S. hospital. The TAM was found to be a robust tool to predict the

physicians' acceptance of the CPOE system. The study found that the PU of the system to be an important predictor of their actual use of the system, when compared to the system ease of use. At a different study, Kowitlawakul (2008) adapted TAM to study the 29 nurses' acceptance of telemedicine technology (eICU) at the critical care units of two healthcare systems in Virginia. A convenience sampling method was used to recruit 117 nurses to fill-in a survey questionnaire. The author found that TAM was able to predict the intention to use the eICU technology system in the nursing population. In addition, PEOU was found to be the main factor that increased attitude toward using technologies.

### **Application of TAM to electronic ADs**

Application of TAM to the incorporation of electronic ADs in EHRs for EoL care is illustrated in Figure 2. This model appears to be particularly applicable in the health information technology field because it focuses on two specific variables believed to influence the use of information technology. PU is the factor that indicates the degree that the person believes the information system will assist them in the performance of their job. PEOU is the second factor, which is used to indicate how difficult the person believes the proposed system would be to use. In the case of this study, the perception of healthcare providers on the use of electronic ADs can be assessed among TAM's constructs: PU and PEOU, and users' intention to use, which can impact their actual usage of the electronic AD. Following TAM, healthcare providers who perceived that electronic ADs are useful and easy to use will have better intention to use the system, which will ultimately lead to higher usage of the system (Lu, Hsiao, & Chen, 2012).

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## CHAPTER THREE

### Research Design and Methodology

This chapter explains the research design of the present study which has the following specific aims: (1) determine the extent to which PU of electronic AD is associated with the healthcare providers' usage of electronic ADs, (2) determine the extent to which PEOU of the electronic ADs is associated with healthcare providers' usage of electronic ADs, (3) determine the extent to which BIU the electronic ADs is associated with healthcare providers' usage of electronic ADs, (4) examine the mean difference in the PU, PEOU, and BIU towards actual usage of the electronic ADs among the six departments; (5) to examine the relationships between the participant demographics and the research constructs. This chapter describes the research setting, research design, sampling procedures, data collection methods, and analysis procedures.

### Research Methods and Design

This study was conducted at Grady Health System, a teaching hospital located in Atlanta, Georgia. The study included a survey methodology with a cross-sectional, correlational quantitative design.

#### Setting

This study was conducted in six different departments at Grady Health System classified as 10A (Inpatient oncology units), 10B (Cancer clinic and infusion center), 9B (Breast cancer clinic), Grady main Hospital Primary Care Center, Internal Medicine, and Others.

**About Grady Health System.** Grady Health System is the largest public hospital-based health system in the Southeast, providing more than 200 specialty and subspecialty health care clinics. The nucleus of Grady's service area is Fulton and

DeKalb counties in Atlanta, where Grady contracts to provide care for the medically underserved, treating many who would be turned away at other hospitals. Grady Health System houses 953 licensed beds, six neighborhood health centers, Crestview Health and Rehabilitation Center, and Children's Healthcare of Atlanta at Hughes Spalding, which is operated as a Children's affiliate. Grady has over 5,000 employees. Grady is an internationally recognized teaching hospital, staffed exclusively by physicians from Emory University School of Medicine and Morehouse School of Medicine. Twenty-five percent of all physicians practicing in Georgia received some or all of their training at Grady (Grady Health System, 2017).

### **Sample**

This study assessed healthcare providers' PU, PEOU, and BIU on the electronic AD forms in EHR as commensurate to the actual usage of the system. The study sample included a convenience sample of clinical staff from six different departments. These departments were chosen to participate in this study because of their relevance to the use of ADs. Clinical staff who participated in this study included nurses, nurse practitioners, physicians, social workers, and case managers.

**Inclusion and exclusion criteria.** The study included convenience sample of nurses, nurse practitioners, physicians, social workers, case managers working in the departments described previously. Inclusion criteria included staff who had been trained in orientation on use of the ADs in the EHR. Healthcare providers in departments such as radiology, pharmacy, laboratory, and administration were excluded from the study because their jobs do not possibly include the use of ADs. Anyone who had not been

through staff orientation, where electronic ADs is discussed were not included in the study.

**Study sample size.** In this study, convenient sampling method was utilized. The sample size was determined by how many were willing to participate in the survey. A total of 165 questionnaires were distributed, and 151 were received for a response rate of 92 percent.

### **Human Subjects**

**Participants' recruitment.** The proposal was evaluated and approved by the University of Missouri Health Sciences Institutional Review Board (see Appendix D). The affiliation agreement between University of Missouri and Grady Health System was established (see appendix E), approval to conduct the study was sought from the Nursing Research Council at the Grady Health System (see Appendix F), Financial Clearance was obtained from Grady Health System (see Appendix G), and final approval to proceed with the research was granted by the Grady Health System Research Oversight Committee (see Appendix H). The PI met with each department's director and discussed the purpose and study methods. The director of each department agreed to help advertise the project among all their staff. During recruitment participants were presented with detailed written instructions in the form of a recruitment letter containing the scope, aims, information about procedures, and study questionnaires (see Appendix B). The recruitment letter also served as consent for the study.

**Participants' confidentiality.** Participants' privacy and confidentiality were maintained throughout the study through anonymous data collection. There was no data collection of identified personal health information in this project. The data collected this

project includes demographic characteristics such as sex, age, ethnicity, religion, role, years of experience, years of education, and departments. Participants' responses on PU, PEOU, and BIU and SU were also part of data collection.

**Potential risks and burden to subjects.** There was no or minimal anticipated physical, financial, legal or other risk to subject involved.

**Inclusion of women, children, and minority.** Adult women participated in the study, but children and minors were not involved in the study.

### **Research Instruments**

The survey instrument used in this study contains a five-point Likert scale, which was adapted from the Technology Acceptance Model (TAM) developed by (Davis, 1989) and modified to include variables as needed for this study. The study survey questionnaire, which has been modified by PI, consisted of two parts: part one consisted of participants' demographics and part two consisted of TAM questions. There were five questions related to PU, nine questions on PEOU, three questions on BIU, and two questions on SU. Questions 1 – 5 were designed to obtain data about the PU of the electronic AD forms in the EHR used by the healthcare providers. Questions 6 –14 are designed to obtain data about the perceived ease of the use of electronic AD forms in the EHR used by the healthcare providers. Questions 15 – 17 are designed to obtain data about the healthcare providers' BIU the electronic AD forms in the EHR. Questions 18 – 19 are designed to obtained data about the SU (see appendix A).

**Reliability and validity of the survey instrument used.** The questionnaire was constructed from instruments that had previously been used and tested for reliability (Davis, 1989). Validity and reliability are two fundamental elements in the evaluation of

a measurement instrument, which can be conventional knowledge, skill or attitude tests, clinical simulations or survey questionnaires (Tavakol & Dennick, 2011). In this study, content validity was established based on the opinion of three experts in the field, Professor Galambos at School of Social Work, University of Missouri; Professor Gregory Alexander at Sinclair School of Nursing, University of Missouri; and Professor Richard Madsen at Medical Research Office, University of Missouri. Feedback led to changing some items of the questionnaire, in addition to eliminating and adding some items. The reliability of the questionnaire was measured for each construct using Cronbach's Alphas (see Table 1). Cronbach's Alpha is a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1 (Tavakol & Dennick, 2011). Internal consistency is defined as the extent to which all the items in a test measure the same concept or construct and hence it is connected to the inter-relatedness of the items within the test (Tavakol & Dennick, 2011). Reliability level was found to be above the recommended minimum standard of 0.60 for most measures. This can be seen for PU where individual correlations between questions range from about 0.69 to 0.90. The value of alpha is about 0.94. For PEOU, the overall alpha is relatively high (about 0.91) but some pairwise correlations are small, mostly for items number 6 and 9 on PEOU scale, which were negatively worded scale items. For BIU, the individual correlations are low and the overall alpha is only about 0.17. The low correlations of the overall BIU score may mean that the questions are measuring different aspects of BIUs (see Table 1).

Table 1

*Cronbach Coefficient Alpha*

Variables	Alpha
PU	0.94
PEOU	0.91
BIU	0.17

**Development and validation of TAM questionnaire.** Davis's TAM provides a valid and reliable measure that predicts the acceptance or adoption of new technologies by end-users (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989). It also is a commonly used model to measure technology acceptance (King & He, 2006). Davis' (1989) TAM model's validity and reliability were established in two studies. Davis' instrument included six items to measure PU and six items to measure PEOU. The first study compared workers' perceptions of usefulness in addition to the ease of use of implemented technologies from workers' self-reported use of these technologies. Some users of computer-based electronic mail (containing file editor software) rated their PU and PEOU respectively and reported the extent each was used. Using pooled data for both technologies, the instrument's Cronbach Alpha reliabilities were high for both PU (.97) and PEOU (.91) in the first study. Both PU and PEOU were significantly correlated with self-reported use of these systems ( $r = .63$  and  $.45$ , respectively;  $p < .001$ ). The second study included a different group of workers in a non-work setting. In this study participants were asked to rate the perceived and PEOU of computer graphics systems that were not in current use and to prospectively predict future adoption. Pooling the data, the Cronbach Alpha reliabilities of this second instrument were high for both PU (.98) and PEOU (.94). Significant correlations with self-predicted use were found for PU ( $r =$

.85,  $p < .001$ ) and PEOU ( $r = .59$ ,  $p < .001$ ). In addition, Davis reported high convergent, discriminant, and factorial validity for both scales in both studies. The association between PU and use was more pronounced in both studies than the association between PEOU and use. Additional analyses suggested that PU mediated the effect of PEOU on use.

Furthermore, Ketikidis, Dimitrovski, Lazuras, and Bath (2012) applied a modified version of the revised TAM to assess the relevant beliefs, and acceptance of Health IT systems in a sample of health professionals ( $N = 133$ ) using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). The Cronbach's Alpha ( $\alpha$ ) was estimated for the TAM-related multi-item measures used in the study. All measures had high internal consistency reliability ( $\alpha > .70$ ). Furthermore, construct validity was assessed by the inter-correlations between the TAM-related variables. All correlations were in the statistically significant and in the expected direction according to the TAM theoretical approach (Ketikidis et al., 2012). In addition, Farahat (2012) modified TAM to identify the determinants of students' acceptance of online learning and investigated how these determinants can shape students' intention to use online learning. The content validity was established based on the opinion of two experts in the field of e-learning, besides piloting the questionnaire on a sample of 17 third year students of Damietta Faculty of Education. The feedback led to changing some items of the questionnaire, in addition to eliminating three items. The reliability of the questionnaire was measured for each construct using Cronbach's alphas. Reliability level was found to be above the recommended minimum standard of 0.60 for all five measures. The calculated Cronbach Alfa values were: PEOU = 0.69, PU = 0.73, BIU = 0.73, SI=0.65.

## **Data Collection**

PI collected the data over the period of two months (December 2016 to January 2017). Data collection occurred during different shifts: day and night shifts in the inpatient units and primarily day shift in the outpatient and primary care clinics. The study questionnaires were administered to the study participants and they were given opportunity to return completed questionnaires to the PI or designated persons in the departments. Participants were informed that the study was not intended to disrupt their work operations. Participants were given two months (the entire months of December 2016 and January 2017) to complete the survey and return the completed survey to the principal investigator. Follow-up was conducted for those participants that did not respond on a weekly basis throughout the period of data collection. No incentives or any form of compensation was provided to the participants.

**Dependent (outcome) variable.** The main outcome that was measured was the actual system usage (SU) of electronic ADs. The SU was self-reported and measured in two ways. First, SU1 was measured by the proportion of cases in percentage the electronic ADs were used. On the other hand, SU2 was measured by number of hours per week the electronic ADs were used.

**Independent variables (IVs).** The independent variables (IVs) include PU, PEOU, BIUs to use and participants' demographic characteristics.

**Demographic characteristics.** The PI developed a demographic questionnaire which described the participant's age(in years), gender (male or female), ethnicity (Native American, Hispanic, Asian, African American, Caucasian, Other), religion (Christianity or Other), medical role/specialty, nurses nurse practitioner, MD/physicians,

social worker, and case manager, years of experience, and educational level (diploma, associate degree, bachelor degree, master degree, doctorate, others

**Perceived Usefulness.** Davis et al. (1989) defined perceived usefulness as “the prospective user’s subjective probability that using a specific application system [Advanced Directive] will increase his or her job performance within an organizational context” (p. 320). PU was assessed as the mean score of five items describing several aspects of PU from using the electronic ADs (e.g., ‘the electronic ADs enhanced prompt decision making for patients’ end-of-life care’).

**Perceived Ease of Use.** Perceived ease of use was also measured with the mean of nine items reflecting several aspects of ease of using electronic AD forms (e.g., ‘the electronic AD forms in the EHR is easy to use’). The measure included technology-specific ease of use and more general beliefs of self-efficacy in using successfully the electronic AD forms.

**Behavioral Intention to Use.** Usage intentions were assessed with the mean score of three items reflecting the behavioral tendency and willingness to use electronic AD forms (e.g., ‘I intent to make use of the electronic AD forms in the HER for end-of-life situations, when needed’).

**Data preparation and management.** To check completeness and accuracy of data, the double data entry was performed. The data were entered into files in Microsoft Excel 2012 twice separately. The two files were then compared for accuracy prior to the data analysis; only a couple of discrepancies were found in data entry and they were corrected. There were two questions on the PEOU scale (6 and 9) and one on the BIU scale (3) that were worded negatively and were reverse scored. In order to calculate a PU

score, the total of the responses to the five questions on the PU survey scale was found. One missing response was allowed in which case the missing value on the PU scale was replaced by the mean of the non-missing values. There were 130 usable PU scores. In order to get an overall PEOU score, the total of the responses to the nine questions on the PEOU scale was found. Up to two missing response were allowed in which case the missing values were replaced by the mean of the non-missing values in the PEOU. The rationale for allowing the missing values is that it is common to allow for some missing values when summing scores over several items because it could be that an item was unintentionally omitted or it could be that an item is irrelevant. However, there is no firm rule as to how many missing to allow, it could be as low as 5 percent to 10 percent or as high as 20 percent to 25 percent, which is the case in this study. Hence, 1 missing out of 5 items (20 percent), 2 missing out of 9 items (22 percent), and 0 missing out of 3 items (0 percent) were allowed. There were 130 usable PEOU scores. In order to get an overall BIU score, the total of the responses to the three questions on BIU scale was found. No missing responses were allowed. There were 142 usable BIU scores.

### **Data Analyses**

A non-parametric statistical technique was used to test the proposed research hypothesis and research questions. Statistical Package for Social Sciences (SPSS) version 23 was used to conduct data analysis. All statistical tests used two-sided p-values and statistical significance was considered for any result with a p-value  $< 0.05$ . Descriptive statistics including mean, standard deviation, frequency, and percentage were computed to describe samples' demographic characteristics. Mean, standard deviation, and variances were used to explain PU, PEOU, and BIU. The Spearman's correlation was

calculated for the analysis. Spearman's rank correlation is a non-parametric test that is used to measure the degree of association between two variables (Sarmiento & Costa, 2017). Spearman's rank correlation test does not make any assumptions about the distribution of the data and is the appropriate correlation analysis when the variables are measured on a scale that is at least ordinal. Spearman's rank correlation coefficient was calculated to identify associations between the three independent variables: PU, PEOU, and BIU towards the use of electronic ADs. The Cronbach's Alpha was used to evaluate the internal consistency of the survey instrument. Non-parametric Kruska-Wallis Test was used to calculate the mean differences in SU, PU, PEOU, BIU among the six departments. Also, in the analysis that was done to find the relationship between the participants' demographics and the TAM constructs (SU, PU, PEOU, and BIU), Spearman's rank correlation coefficient was used for ordinal variables (gender and role), while non-parametric Kruska-Wallis test was used for the categorical variables (age group, years of experience, and educational level).

**Specific aim 1.** To determine the extent to which PU is associated with the SU of electronic ADs.

**Research question 1.** Are there associations between the PU and the SU of electronic ADs?

**Statistical analysis.** Spearman's rank correlation coefficient was calculated to examine the association between the PU and SU and to determine whether the association is significantly different from zero.

**Specific aim 2.** To determine the extent to which PEOU is associated with the SU of electronic ADs.

**Research question 2.** Are there associations between the PEOU and the SU of electronic ADs?

**Statistical analysis.** Spearman's rank correlation coefficient was calculated to examine the association between the PEOU and SU. A test was done to determine whether the correlation coefficient is significantly different from zero, and, hence to determine if there is evidence of an association between the PEOU and SU.

**Specific aim 3.** To determine the extent to which BIU is associated with the SU of electronic ADs.

**Research question 3.** Are there associations between the BIU and the SU of electronic ADs?

**Statistical analysis.** Spearman's rank correlation coefficient will be calculated to examine the association between the BIU to use and SU. A test was done to determine whether the correlation coefficient is significantly different from zero, and, hence to determine if there is evidence of an association between the two variables.

**Specific aim 4.** To examine the differences in the PU, PEOU, and BIU towards SU of the electronic AD among the six departments.

**Research question 4.** Are there differences in the PU, PEOU, and BIU towards SU of the electronic AD among the six departments?

**Statistical analysis.** The nonparametric Kruskal-Wallis test was used to examine the differences in SU scores for PU, PEOU, and BIU across the six departments, using a standard  $p$  value of  $< .05$  to denote statistical significance.

**Specific aim 5.** To examine the associations among the participants' demographics and the research variables.

**Research question 5.** Are there associations among the participants' demographics and the research variables?

**Statistical analyses.** The demographic characteristics were compared by using the Spearman correlations for ordinal variables (age group, years of experience, and educational level) and Kruskal-Wallis tests for categorical variables (Gender and Role) with the research variables (PU, PEOU, BIU, and SU). Ethnicity and religion were excluded.

The research hypotheses are:

H1: PU will have significant positive correlation with the SU of the electronic ADs.

H2: PEOU will have significant positive correlation with the SU of the electronic ADs

H3: BIU will have significant positive correlation with the SU of the electronic ADs.

H4. Mean differences of PU, PEOU, and BIU towards the SU of the electronic ADs will exist among the six departments.

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## **CHAPTER FOUR**

### **Research Results**

The purpose of this study is to explore perceptions of healthcare providers' use of electronic AD forms in an EHR using the TAM model. This chapter starts with presenting the demographic characteristics of the study participants, followed by descriptive statistics, then, the presentation of the results of the quantitative data analysis using the SPSS version 23.

#### **Demographics of the Survey Respondents**

Table 2 depicts the demographic characteristics of the survey participants, while figures 3-10 depict pie chart of showing percentage of the survey respondents. Most of the participants were female (N = 101, 66.9 %), male (N = 50, 33.1%). The majority of the participants 39.1 % (N = 59) were below the age of 30, followed by 31.1 % (N = 47) between the ages of 30 – 39, while only 3.1 % (N =6) were over the age of 59 (see Table 4.1). The largest group of the participants 46.4 % (N = 70) were African American, followed by Caucasian 21.2 % (N = 32), while 17.2 % (N = 26) indicated as Native American. Most participants 51.67% (N = 78) were physicians/medical doctors, followed by 37.8% (N = 57) nurses, while only 3.1 % (N = 6) were social workers. The majority of participants 40.4 % (N = 61) had 1- 5 years of experience, while 23.2% (N=35) had less than 1 year of experience. The majority of the participants 47.7% (N = 72) had a medical doctorate degree, followed by 24.5% (N=37) who had bachelor degree, while 10.7% (N=16) had associate degree. Just over one fourth of participants 27.2% (N=41) worked at Grady Main Hospital Primary Care Center, followed by 26.5% (N=40) who worked in 10A Inpatient Oncology Unit and 22.5% (N=34) who worked in 10B Cancer Clinic &

Infusion Center; 14.6 % (N=22) work in Internal Medicine; 5.3% (N=8) indicated 9B Breast Cancer Clinic; while only 3.1% (N=6) indicated other departments.

Table 2

*Demographic Characteristics of the Survey Respondents (N =151)*

<b>Variables</b>	<b>Frequency</b>	<b>Percent</b>
Gender		
Male	50	33.1
Female	101	66.9
Age		
<30	59	39.1
26 – 39	47	31.1
40 – 49	29	19.2
50 – 59	10	6.6
>60	6	4.0
Ethnicity		
Caucasian	32	21.2
Africa American	70	46.4
Hispanic	17	11.3
Asian	26	17.2
Others	6	4.0
Religion		
Christianity	102	68.0
Jewish	17	11.3
Muslim	3	2.0
Buddhist	5	3.3
Other	23	15.3
Role		
Nurse	57	37.8
Administrator	1	0.7
Nurse Practitioner	4	2.7
MD/Physician	78	51.7
Social Worker	6	4.0
Other	5	3.3
Year of Experience in Clinical Practice		
< 1	35	23.2
1 – 5	61	40.4
6 – 10	24	15.9
11 – 15	8	5.3
> 15	23	15.2
Educational Level		
Diploma	1	0.7
Associate degree	16	10.6

Bachelor degree	37	24.5
Master degree	24	15.9
Doctorate/MD	72	47.7
Others	1	0.7
<b>Department</b>		
10A-Inpatient Oncology Unit	40	26.5
10B Cancer Clinic	34	22.5
9B Breast Cancer Clinic	8	5.3
Grady Primary Care Clinic	41	27.2
Internal Medicine	22	14.6
Others	6	3.9

Figure 3: Percentage of Gender of the Survey Respondents (N =151)

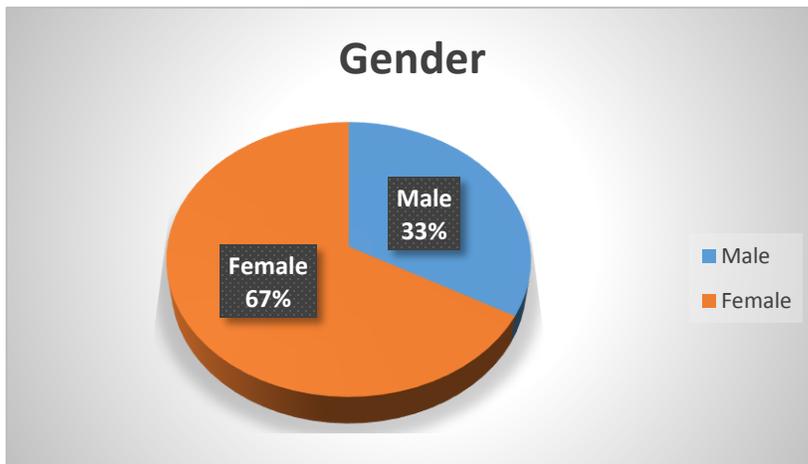


Figure 4: Percentage of Age Group of the Survey Respondents (N=151)

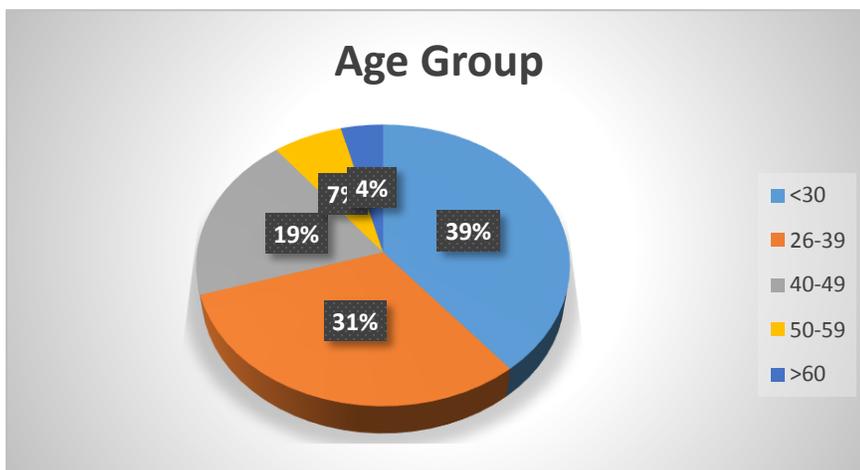


Figure 5: Percentage of Ethnicity of the Survey Respondents (N=151)

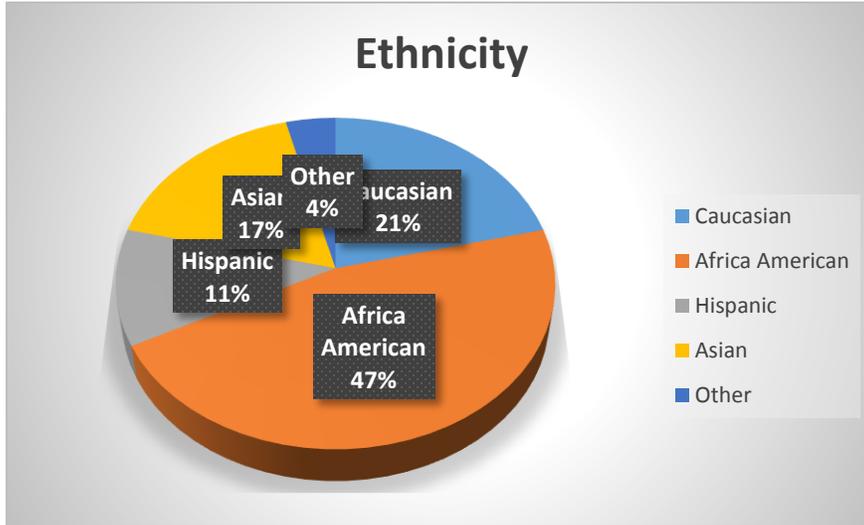


Figure 6: Percentage of Religions of the Survey Respondents (N=151)

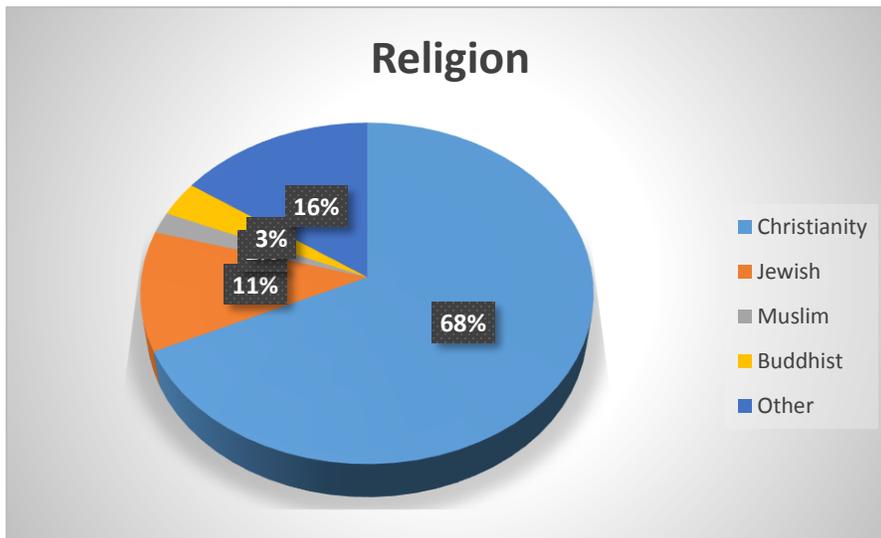


Figure 7: Percentage of Role of the Survey Respondents (N =151)

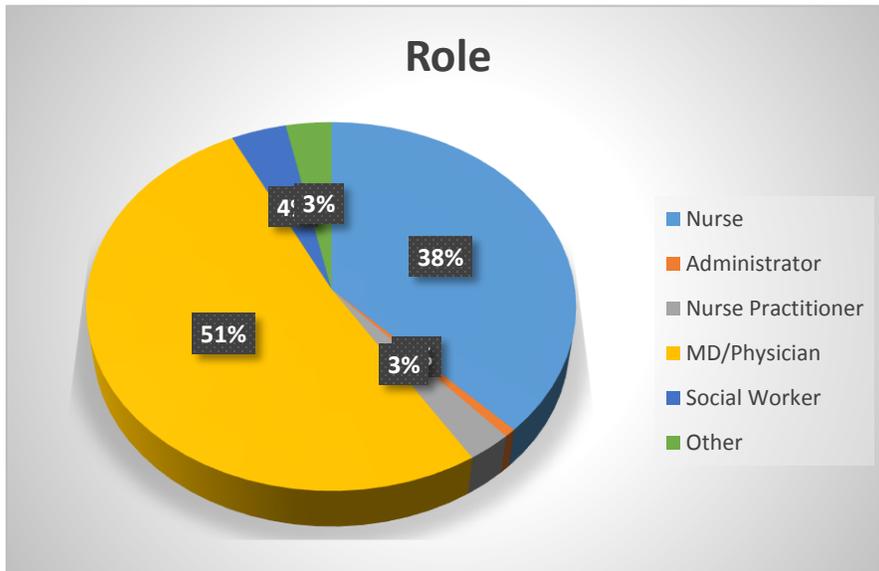


Figure 8: Percentage of Years of Experience of the Survey Respondents (N=151)



Figure 9: Percentage of Educational Level of the Survey Respondents (N=151)

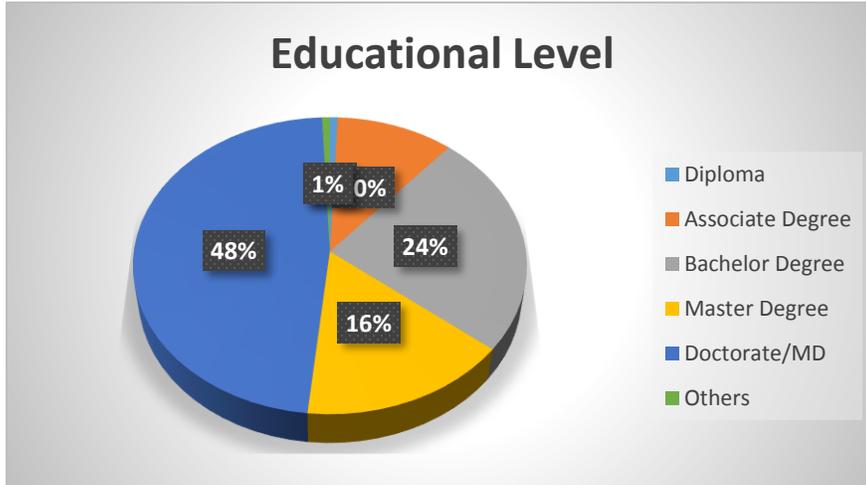
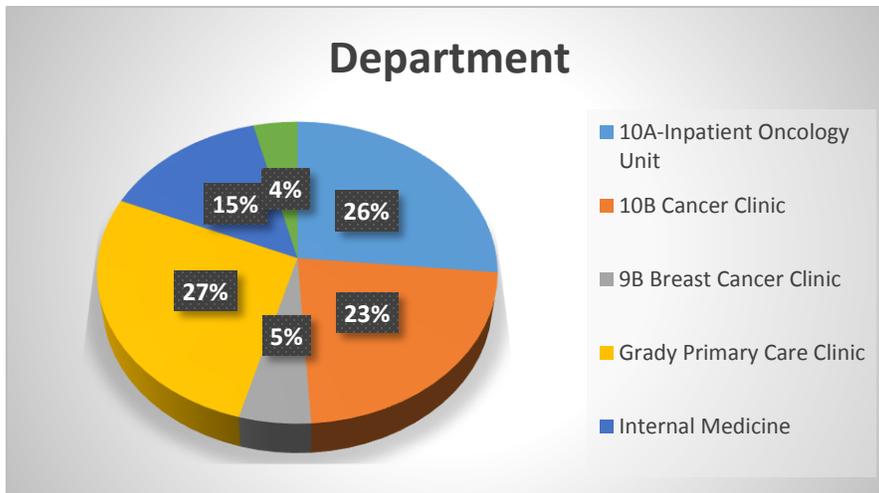


Figure 10: Percentage of Departments of the Survey Respondents (N=151)



### **Descriptive Statistics: PU, PEOU, BIU, and SU towards Electronic ADs**

Healthcare providers' perceived usefulness, perceived ease of use, and behavioral intention to use towards the electronic ADs were identified as the determinants of SU of the electronic ADs. Descriptive statistics were conducted to identify the status of these determinants between research participants. Table 3 summarizes the frequency of the participants' scores based on their responses on the four constructs of the questionnaire.

Table 3

*Descriptive Statistics for Numeric Variables*

Variable	SU1	SU2	PU	PEOU	BIU
N	150	150	130	130	142
Mean	2.53	2.39	22.92	38.76	14.35
Lower Quartile	2	2	20	31	13
Median	2	2	25	40	14
Upper Quartile	3	3	28	46	16
Std Deviation	1.25	1.05	5.65	9.34	1.84
Minimum	1	1	5	19	10
Maximum	5	5	30	53	18

The SU was measured in two ways: By proportion of cases (SU1) and by hours per week (SU2). The mean value of SU1 is a gauge of usage of electronic ADs by answering the question, “how often did you use the electronic AD forms in the EHR?” As seen in Table 3, the SU1 has a mean value of 2.53 with the minimum value of 1, maximum value of 5 and the median value of 2. With a mean value of 2.53, the study revealed that between 20-50% of the cases, an EHR was used to find ADs documentation. SU2 is a gauge of number of times of electronic ADs usage by answering the question, “how many hours do you use the system each week?” The response has a mean value of 2.39 with the minimum value of 1, maximum value of 5 and the median value is 2. A mean value of 2.39 means that participants indicated that electronic ADs were used between 1-2 hours each week. A median of 2 indicates that at least half of the participants gave a response of 2; given a possible range of 1 to 5, a 2 is on the low side. The PU has a mean value of 22.9 with the minimum value of 5, maximum value of 30, and the median value is 25. With a mean value of 22.9, average participants indicate agreement regarding the usefulness of the electronic ADs. This means that electronic

ADs are readily available to use, enhance prompt decision making regarding EoL care, enhance effectiveness, and make it give greater control over advance care planning for patients. A median of 25 indicates that at least half of the participants gave a response of 25; given a possible range of 5 to 30, a 25 is on the high side. The PEOU has a mean value of 38.8 with the minimum value of 19, maximum value of 53, and median of 40. A mean value of 38.8 means that average participants agreed that electronic ADs are clear, understandable, and easy to use, locate, and access. A median of 40 indicates that at least half of the participants gave a response of 40; given a possible range of 19 to 53, a 40 is on the high side. Finally, the BIU has a mean value of 14.4 with the minimum value of 10 and maximum value of 18, and the median value of 14. A mean value of 14.4 means that average participants indicated agreement regarding intention to make use of the electronic ADs for EoL care. A median of 14 indicates that at least half of the participants gave a response of 14; given a possible range of 10 to 18, a 14 is on the high side.

### **Research Question 1 (RQ1): Associations between PU and SU**

Are there associations between PU and SU of electronic ADs? To address this question, the author calculated the Spearman correlation between the measured PU and SU of electronic ADs and tested the null hypothesis that the correlation is different from zero. Spearman's correlation is also valid for variables whose distribution is approximately normal. The correlations are relatively strong ( $r = 0.70$ ,  $p < 0.0001$ ) and significantly different from zero (see Table 4). To see the relationship graphically, the box-plots showing the distribution of PU scores for each level of SU1 (or SU2) were constructed. The line on the graphs connects the median values. Figures 11 and 12

showed that the participants who have higher SU tend to have a higher degree of PU.

This shows that increased PEOU leads to higher SU (see Figures 11 and 12).

Table 4

*Spearman Correlation Coefficients*

		PU
SU1	Corr. Coefficient	0.72
	Sig.(2-tail)	<0.0001
	N	129
SU2	Corr. Coefficient	0.70
	Sig.(2-tail)	<0.0001
	N	129

SU1 = measure of SU by proportion of cases

SU2 = measure of SU by hours per week

Figure 11: Distribution of PU scores for each level of SU (% cases).

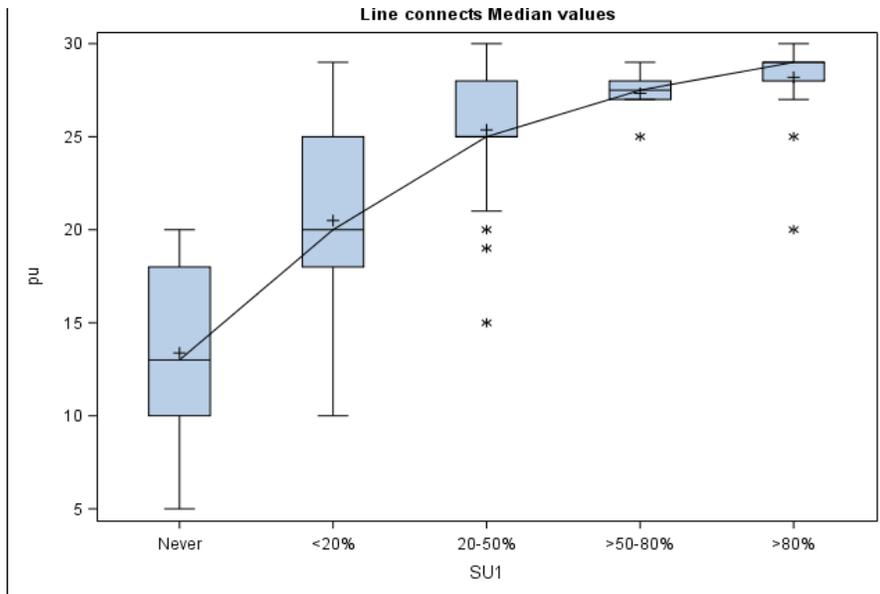
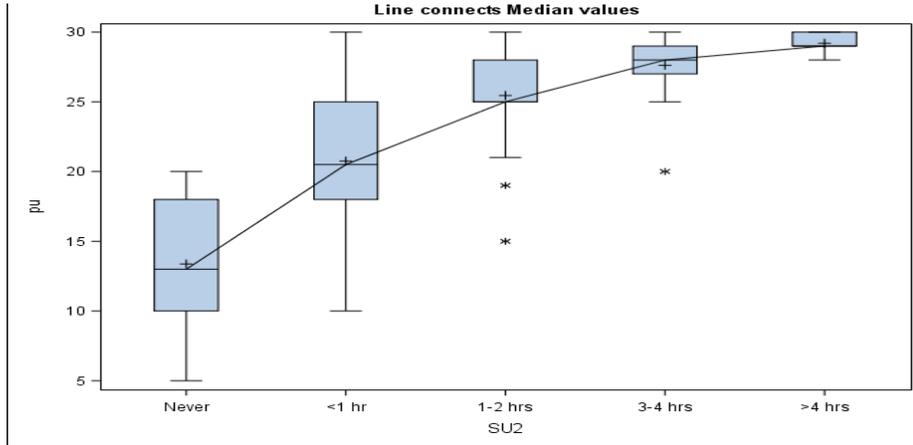


Figure 12: Distribution of PU scores for each level of SU (% hours/week)



### Research Question 2 (RQ 2): Associations between PEOU and SU

Are there associations between the PEOU and SU of electronic ADs? To address this question, Spearman's correlation was calculated to test the null hypothesis that the relationship is not statistically different zero. The results demonstrate that correlations between PEOU and SU are strong ( $r= 0.70$ ,  $p<0.0001$ ) and significantly different from zero (see Table 5). To see the relationship graphically, box-plots showing the distribution of PEOU scores for each level of SU1 (or SU2) were constructed. The line on the graphs connects the median values. This shows that increased PEOU leads to high SU (see Figures 13 and 14). Results are very similar to those for RQ1.

Table 5

		PEOU
SU1	Corr. Coefficient	0.73
	Sig.(2-tail)	<0.001
	N	129
SU2	Corr. Coefficient	0.70
	Sig.(2-tail)	<0.001
	N	129

SU1 = measure of SU by proportion of cases  
 SU2 = measure of SU by hours per week  
 PEOU = Perceived ease of use

Figure 13: Distribution of PEOU scores for each level of SU (% cases).

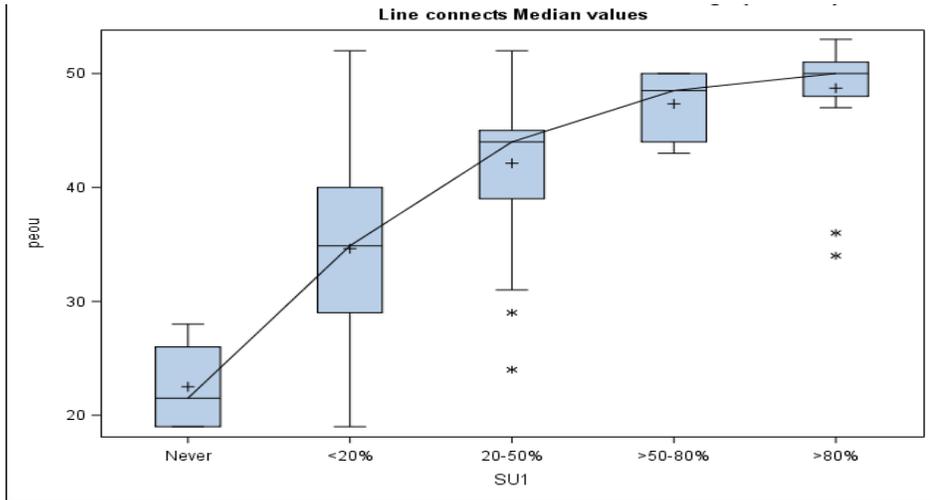
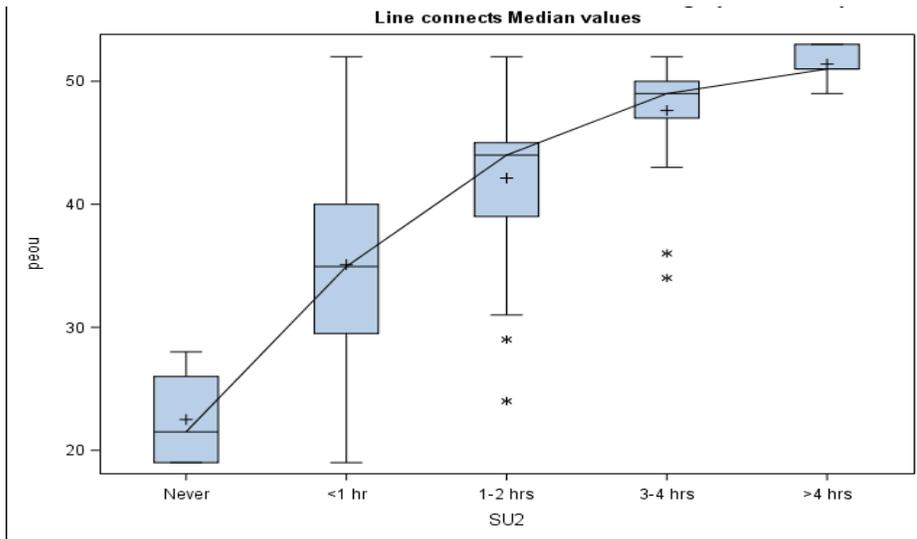


Figure 14: Distribution of PEOU scores for each level of (% hours/week)



### Research Question 3 (RQ 3): Associations between BIU and SU

Are there associations between the BIU and SU of electronic ADs? To address this question, Spearman's correlation was used to test the null hypothesis that the correlation is not statistically significant from zero. The correlations are not very strong ( $r = 0.22$ ,  $p < 0.004$ ) but are significantly different from zero (see Table 6). To see the relationship graphically, box-plots showing the distribution of BIU scores for each level of SU1 (or SU2) were constructed (see Figures 15 and 16). The line on the graphs connects the median values. Those who have higher use tend to have a moderate correlation between BIU and SU.

Table 6

#### *Spearman Correlation Coefficients*

		BIU
SU1	Corr. Coefficient	0.24
	Sig.(2-tail)	0.004
	N	142
SU2	Corr. Coefficient	0.22
	Sig.(2-tail)	0.007
	N	142

SU1 = measure of SU by proportion of cases

SU2 = measure of SU by hours per week

BIU = behavioral intension to use

Figure 15: Distribution of BIU scores for each level of SU (% cases).

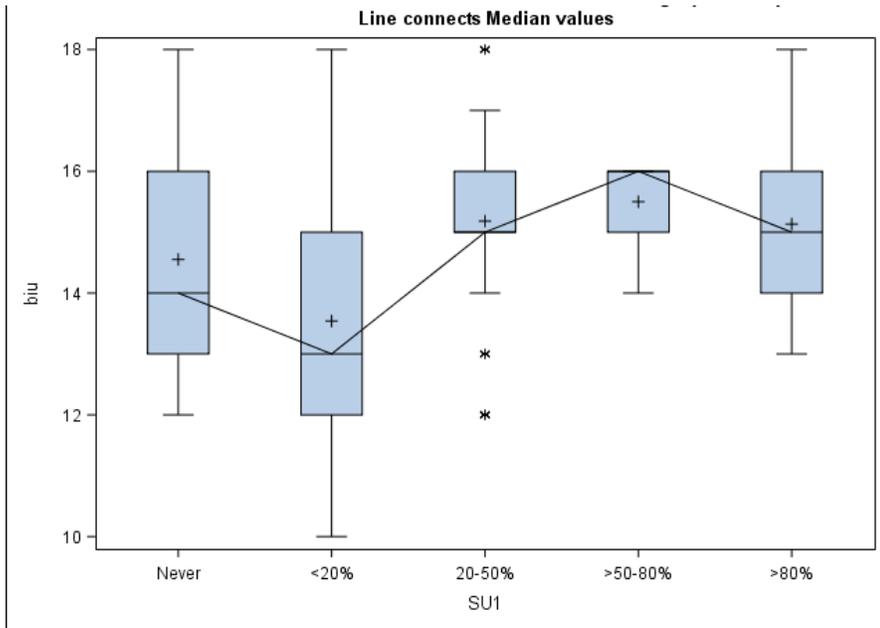
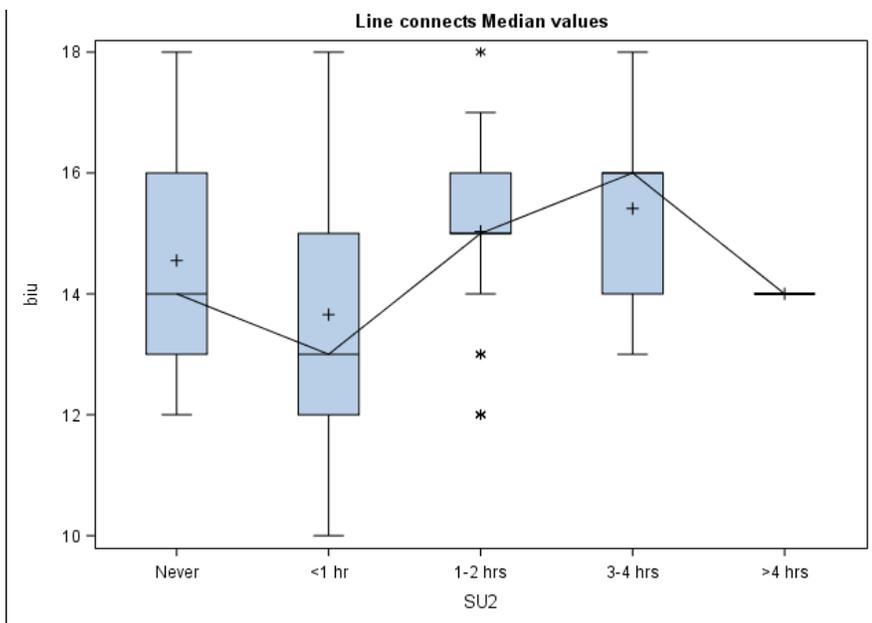


Figure 16: Distribution of BIU scores for each level of SU (% hours/week).



#### **Research Question 4 (RQ 4): Mean Differences in PU, PEOU, and BIU towards SU**

Are there mean differences in the PU, ease of use, and BIU towards actual usage of the electronic AD among the six departments? In this case, responses across the six departments were compared. The nonparametric Kruskal-Wallis test was used for this analysis. Since there are six departments, there are 15 different pairs of departments used in comparisons, when looking for differences. Adjustment in p-values was made for multiple comparisons. Sample sizes among different departments are quite different, ranging from 6 to 41. Table 7 below depicts results for the Kruskal-Wallis tests  $\chi^2(5) = 79.325$ ,  $p < 0.000$ . All tests are highly significant with  $p < .0004$  for BIU and  $p < 0.0001$  for PU and PEOU (see Table 8). This tells us that there are departmental differences but does not tell us which departments differ from the others. The next results show which departments differ from one another. For PU and PEOU, Grady Primary Care Clinic has a higher usage of electronic ADs compared to other departments (see Figures 17 and 18). Also, for BIU, Grady Primary Care Clinic has a usage of electronic ADs than 10A and 10B (see Figures 19).

Table 7

##### *Kruskal-Wallis test result*

Observation	Variable	P-value
2	SU	0.000
3	PU	0.0001
6	PEOU	0.0001
9	BIU	0.0004

PU = Perceived usefulness

PEOU = Perceived ease of use

BIU = Behavioral intension to use

SU = System Usage

Table 8

*Pairs that differ significantly*

Variables	Comparison	P-Value
PU	9B Breast Cancer Clinic vs. Grady Main Hospital Primary Care Clinic	0.01
PU	10B Cancer Clinic & Infusion Center vs. Grady Main Hospital Primary Care Clinic	<.001
PU	10A - Inpatient Oncology Unit vs. Grady Main Hospital Primary Care Clinic	<.001
PU	Internal Medicine vs. Grady Main Hospital Primary Care Clinic	<.001
PEOU	9B Breast Cancer Clinic vs. Grady Main Hospital Primary Care Clinic	0.02
PEOU	10B Cancer Clinic & Infusion Center vs. Grady Main Hospital Primary Care Clinic	<.001
PEOU	10A - Inpatient Oncology Unit vs. Grady Main Hospital Primary Care Clinic	<.001
PEOU	Internal Medicine vs. Grady Main Hospital Primary Care Clinic	<.001
BIU	10B Cancer Clinic & Infusion Center vs. Grady Main Hospital Primary Care Clinic	<.001
BIU	10A - Inpatient Oncology Unit vs. Grady Main Hospital Primary Care Clinic	0.005

Figure 17: Distribution of PU scores for each Department

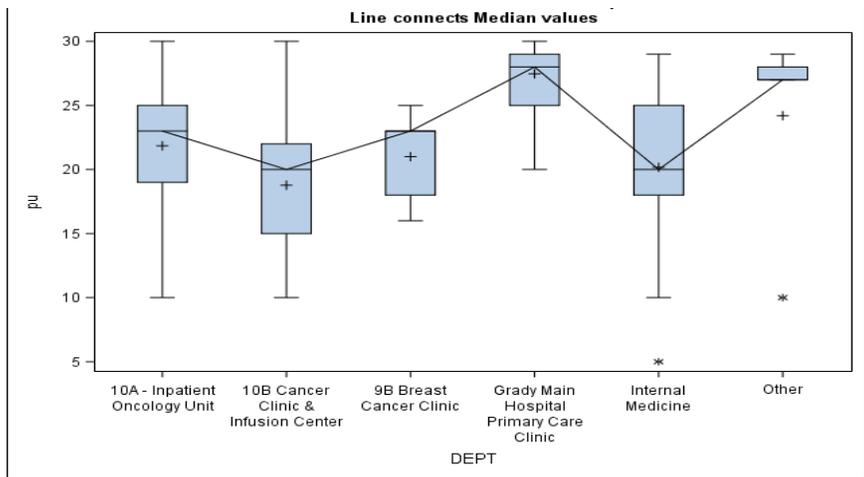


Figure 18: Distribution of PEOU scores for each Department

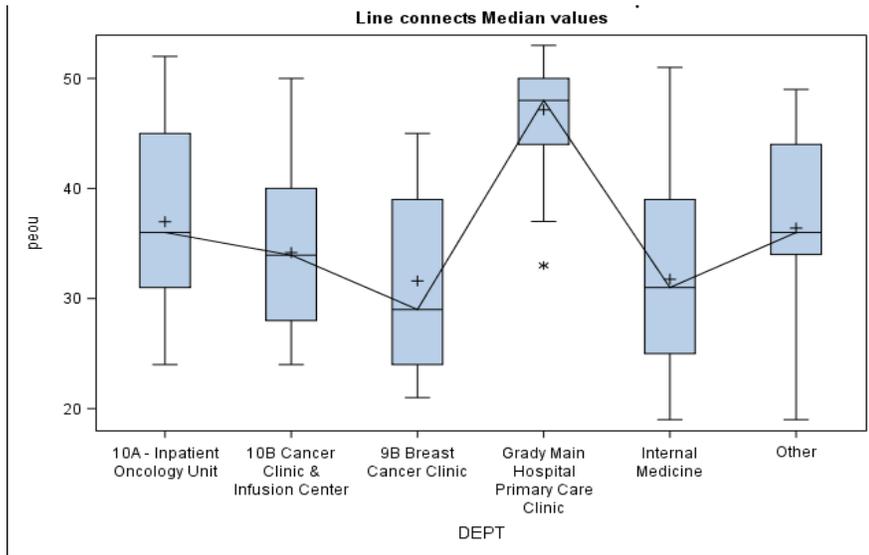
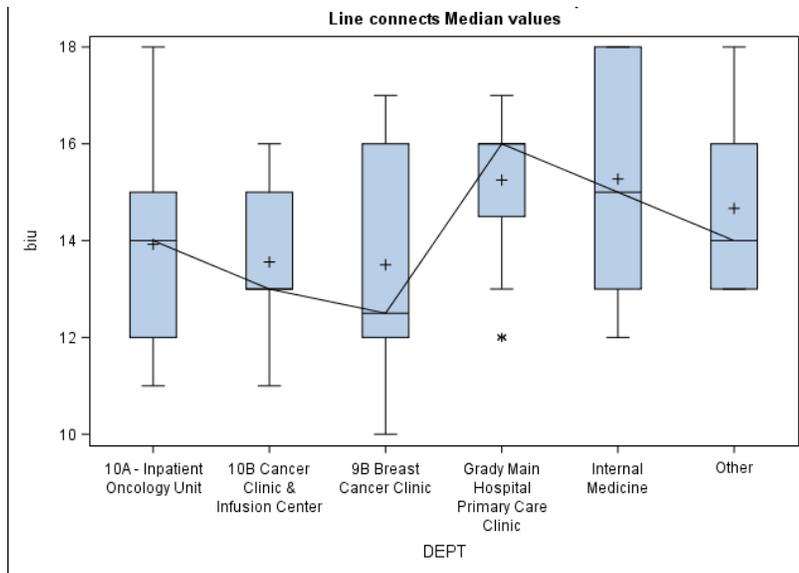


Figure 19: Distribution of BIU scores for each Department



**Research Question 5 (RQ 5): Associations between Participants’ Demographics and TAM Constructs**

Are there associations between the participants’ demographics and TAM Constructs? The PI looked at Gender and Role as categorical variables and looked at age group, year of experience, and education (excluding items 1 and 6 on education scale because there was only one subject in each of these groups) as ordinal variables. In this analysis Spearman’s correlations between ordinal variables and Kruskal-Wallis tests for categorical variables were calculated. There are no cases of significant correlations and no cases where the Kruskal-Wallis test was significant at the  $p < 0.01$  level (see Tables 9, 10, and 11).

Table 9

*Relationship between Gender Differences and Research Variables*

Number of Observation	Variable	P-value
3	PU	0.19
6	PEOU	0.51
9	BIU	0.12

PU = PU

PEOU = PEOU

BIU = Behavioral intension to use

Table 10

*Relationship between Role Differences and Research Variables*

Obs	Variable	P-value
3	PU	0.31
6	PEOU	0.14
9	BIU	0.11

PU = PU

PEOU = PEOU

BIU = Behavioral intension to use

Table 11

*Spearman Correlation Coefficients between Age, Year of Experience, Educational Level and Research Variables*

		PU	PEOU	BIU
AGE	Corr. Coefficient	-0.01	-0.03	-0.17
	Sig.(2-tail)	0.88	0.77	0.05
	N	130	130	142
YOE	Corr. Coefficient	0.08	0.10	-0.15
	Sig.(2-tail)	0.37	0.26	0.08
	N	130	130	142
EL	Corr. Coefficient	0.001	-0.02	0.07
	Sig.(2-tail)	0.94	0.82	0.42
	N	129	129	140

PU = PU

PEOU = PEOU

BIU = Behavioral intension to use

YOE = Year of experience

EL = Education level

In summary, of the 165 surveys distributed, a total of 151 participants (92%) responded: 67% female (n = 101), 33% male (n = 50). Participants included physicians (n=78); staff nurses (n=57); nurse practitioners (n=4); social workers/case managers (n=6); administrators (n=1); and others (n=5). There was a moderately strong positive correlation between Perceived Usefulness and Actual System Usage ( $r=0.70$ ,  $p<0.0001$ ). Likewise, Perceived Ease of Use and Actual System Usage had a moderately strong positive correlation ( $r=0.70$ ,  $p<0.0001$ ). In contrast, the strength of the relationship between Behavioral Intention to Use and Actual System Usage was more modest ( $r=0.22$ ,  $p<0.004$ ). In addition, the results of the Kruskal-Wallis H test found there was a statistically significant differences in the Actual System Usage of the electronic ADs between the 6 departments  $\chi^2(5) = 79.325$ ,  $p < 0.000$ . Specifically, the Primary Care Clinics are highly significant with  $p=0.0004$  for Behavioral Intention to Use and  $p<0.0001$  for Perceived Usefulness and Perceived Ease of Use. There were not significant relationships between the participants' demographics and the research variables.

## CHAPTER FIVE

### Discussion and Conclusion

Understanding the way in which people react to the emergence of new clinical technologies is of great relevance to the field of nursing. For one reason, low acceptance of health information technology in clinical settings, results in delay and even failure to successfully implement Health IT systems, and to achieve relevant organizational goals, such as effective patient management (Ketikidis et al., 2012).

#### **The Relationships between PU and SU of Electronic ADs**

The correlations between the PU and the healthcare worker's usage of electronic ADs are relatively strong ( $r= 0.70$ ,  $p<0.0001$ ) and significantly different from zero. Respondents that used the electronic ADs in the EHR indicated that these electronic forms are perceived to be useful in their work. The use of the electronic ADs was reported to be readily available to use for patient care; enhanced prompt decision making for patients' end-of-life care; makes it easier to follow patients' directives for end-of-life care; gives me greater control over the advance care planning for patients; and enhances my effectiveness in patients' end-of-life care.

In this analysis, the nature of the relationship between PU their relative effect on SU was consistent with previous research. The results can be interpreted that higher PU of electronic ADs in EHRs results in greater SU among these test subjects. This study indicated that increased PU leads to increased usage of electronic ADs as shown in other studies (Pai & Huang, 2011; Farahat, 2012; Ketikidis et al., 2012; Sharma & Chandel, 2013). Pai and Huang (2011) assessed the intention to use healthcare information system using Venkatesh and Davis' updated TAM found that PU and PEOU significantly affect

users' BIU, with a path coefficient of 0.498 and p-value at 0.001. Likewise, Farahat (2012) used TAM to identify the determinants of students' acceptance of online learning and investigated how these determinants can shape students' intention to use online learning. The results of the study revealed that students' perception of ease of use, usefulness, and attitudes towards online learning was identified as significant determinants of students' intention to practice online learning. In addition, Ketikidis et al. (2012) found that PEOU, but not PU, relevance and subjective norms directly predicted Health IT usage intentions in their study that applied a modified version of the revised TAM to assess the relevant beliefs, and acceptance of Health IT systems in a sample of health professionals (N = 133).

### **The Relationships between the PEOU and SU of Electronic ADs**

The correlations between the PEOU and SU of electronic ADs are relatively high ( $r = 0.70$ ,  $p < 0.0001$ ) and significantly different from zero. The responses indicated a positive correlation between the PEOU and SU of the electronic ADs. The responses revealed that learning to use electronic ADs was easy for them; staff can confidently use the electronic ADs; staff also find the AD forms in the EHR easy to use, easy to locate, and accessible. Similarly, in this analysis, the nature of the relationship between PEOU and their relative effect on SU were consistent with previous research. This study indicated that increased PEOU leads to increased usage of electronic ADs as shown in other studies described above (Pai & Huang, 2011; Farahat, 2012; Ketikidis et al., 2012; Sharma & Chandel, 2013). It can be interpreted that there is a perception among the healthcare providers who use electronic ADs have higher PEOU, which in turn, results in higher SU.

### **The Relationships between BIU and SU of Electronic ADs**

The correlations between BIU and SU of electronic ADs are not very high ( $r = 0.22$ ) but are significantly different from zero. The survey respondents who have higher use tend to have a moderately higher degree of BIU but the results do not strictly increase. The survey respondents indicated that they would be willing to use electronic ADs and would be willing to spend time to learn such a system. The BIU-usage correlation observed in the survey data was lower, although similar result was found in a study conducted by Money and Turner (2004), in which a low correlation exists between the BIU and SU of the management information system; this was also lower than observed in most previous TAM research. On the contrary, Cowen (2009) applied TAM to find the relationship that exists between a users' PU, PEOU and subjective norm on the user's intention to operate radiology technology. The results of the study showed that a statistically significant relationship exists between PEOU and PU as well as PU and intention to use the radiology technology.

### **Mean Differences in the PU, PEOU, and BIU towards SU of the electronic ADs**

In this case, responses across the six departments were compared using the nonparametric Kruskal-Wallis test  $\chi^2(5) = 79.325$ ,  $p < 0.000$ . Although, the sample sizes among departments are quite different ranging from 6 to 41, all tests were highly significant with  $p < .0004$  for BIU and  $p < 0.0001$  for PU and PEOU. More also, for PU and PEOU, Grady Health System Primary Care Center is significantly different (higher) than all other departments that participated in the study. Similarly, for BIU, Grady Health System Primary Care Center is significantly different (higher) than 10A and 10B. The highest responses about PU, PEOU, and BIU towards SU of the electronic ADs in

the primary care clinic may be because providers in the primary care centers have the opportunity to engage patients in discussions about ADs during their routine medical visits (Myers, Duthie, Denson, Denson, & Simpson, 2017).

### **The Relationships among the Participants' Demographics and the TAM Constructs**

Spearman correlations were done for ordinal variables and Kruskal-Wallis tests were done for categorical variables to test for significant statistical difference among the participant's demographics and the research variables. It can be noted that, there are no cases of significant correlations and no cases where the Kruskal-Wallis test was significant at the 0.01 level. The only finding in this research inconsistent with previous TAM research concerns is BIU construct. A possible explanation for inconsistent results centering on BIU may lie in the nature of the research survey questions related to the BIU.

### **Implications for Practice**

Healthcare providers are obligated to respect the autonomy of residents. ADs assist with the identification of patients' beliefs, desires, and choices and, when used properly, protect patients' self-determination, an important practice value for social workers, physicians, nurses, and other health professionals (Galambos, Starr, Rantz, & Petroski, 2016). This study is very important and timely especially in the age where EHRs have become vehicle for information communication and exchange among the multidisciplinary team of healthcare professionals. Advanced directive documentation must be readily accessible to clinicians (Wilson et al., 2013). According to Turley, Wang, Meng, Kanter, and Garrido (2016), multiple strategies are required to improve advance care planning and ensure that care is patient-centered. For instance, strategies to facilitate

clinician-patient discussions, clinical processes that improves documentation rates of patient wishes at the EoL, and workflows that promote enhanced retrieval of documented patient preferences, including information about health care proxies or surrogate decision makers, from the medical record (Meng, Kanter, & Garrido, 2016).

The findings of this study add to the body of knowledge about the role of EHRs in improving accessibility and availability of ADs for the healthcare providers, thereby promoting compliance with ADs utilization of the electronic ADs and increasing quality of EoL care. Practically, the findings of this study may also help health care decision makers proactively introduce interventions to encourage acceptance of electronic AD and may also assist health policy makers refine relevant policies to promote the standardization of the location and accessibility of the electronic ADs innovations in the EHR.

### **Limitations of the Study**

This study has a number of limitations. First, it was conducted in a very few departments at Grady Health System that use one type of EHR (Epic). Epic EHR users have different versions and customizations of the software that can be used for AD documentation. The results of this study cannot be generalized to other types of EHRs or to other Epic users. Additionally, the data on actual usage of the electronic ADs was based on the self-report on the survey questionnaire, which may not accurately reflect actual usage.

### **Recommendations for Future Research**

Wherever possible, future researchers should endeavor to collect and analyze both self-report and objective usage data, perhaps collected directly from the EHR. This would

help resolve lingering questions regarding this important construct and its effect on existing TAM research. More also, a correlation quantitative approach was used to study the perceptions of healthcare providers about the use of electronic ADs in the Epic EHR. Findings of this study are somewhat limited because of the convenience sampling method employed. In addition, considering the fact that this study was conducted using only very few departments at Grady Hospital with small sample size, it could have been more ideal if this study can be conducted in multiple hospitals that use Epic EHR. This may produce variability in the demographics of the participants and generalizability of the study. Therefore, it is recommended for future researchers to conduct hospital-wide study involving two to three different hospitals and if possible include different types of EHRs such as Allscripts, NextGen Healthcare, Practice Fusion, or other types of EHRs with AD documentation capabilities.

## **Conclusion**

The relationships among primary TAM constructs found in this research are largely consistent with those typical in previous TAM research, with the exception of the BIU the system, which is slightly different. That is, the relationship between BIU and SU of electronic ADs are not very high with p-value of about 0.22. Significant positive relationships between PU, PEOU, and SU were consistent with previous TAM research. This study shows that the perceptions of the healthcare providers have a great influence on the use of electronic ADs, which is paramount to the executions of the ADs especially for patients at the EoL.

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APPENDICES

Appendix A: Research Questionnaire

Demographic Characteristics of the Healthcare Providers

**Sex**

- \_\_\_ 0 - Male
- \_\_\_ 1 - Female

**Age**

- \_\_\_ 1 = below 30
- \_\_\_ 2 = 30 – 39
- \_\_\_ 3 = 40 – 49
- \_\_\_ 4 = 50 – 59
- \_\_\_ 5 = Above 60

**Ethnicity**

- \_\_\_ 1 - Caucasian
- \_\_\_ 2 - African American
- \_\_\_ 3 - Hispanic
- \_\_\_ 4 - Native American
- \_\_\_ 5 - Asian
- \_\_\_ 6 - Other, please specify \_\_\_\_\_

**Religion**

- \_\_\_ 1 - Christianity
- \_\_\_ 2 - Jewish
- \_\_\_ 3 - Muslim
- \_\_\_ 4 - Buddhist
- \_\_\_ 5 - Atheist
- \_\_\_ 6 - Other, please specify \_\_\_\_\_

**Department**

- \_\_\_ 1. 10A - Inpatient Oncology Unit
- \_\_\_ 2. 10B Cancer Clinic & Infusion Center
- \_\_\_ 3. 9B Breast Cancer Clinic

**Role**

- \_\_\_ 1 - Nurse
- \_\_\_ 2 - Administrator
- \_\_\_ 3 - Nurse Practitioner
- \_\_\_ 4 - MD/Physician
- \_\_\_ 5 - Social Worker
- \_\_\_ 6 - Case Manager
- \_\_\_ 7 - Other, please describe \_\_\_\_\_

**Years of Experience**

- \_\_\_ 1 - < 1
- \_\_\_ 2 - 1 – 5
- \_\_\_ 3 - 6 – 10
- \_\_\_ 4 - 11 – 15
- \_\_\_ 5 - > 15

**Years of Education**

- \_\_\_ 1 - Diploma
- \_\_\_ 2 - Associate degree
- \_\_\_ 3 - Bachelor degree
- \_\_\_ 4 - Master degree
- \_\_\_ 5 - Doctorate
- \_\_\_ 6 - Medical Doctor (MD)
- \_\_\_ 7 - Highest degree obtained \_\_\_\_\_

- \_\_\_ 4. Grady Main Hospital Primary Care Clinic
- \_\_\_ 5. Internal Medicine
- \_\_\_ 6. Other: \_\_\_\_\_

**Technology Acceptance Model Questionnaire for Advance Directives Forms in the Epic EHR**

Please place an "X" in the appropriate box to rate the following items using a scale of 1-6:  
 1= Strongly Disagree 2= Disagree 3= Slightly Disagree 4= Slightly Agree 5= Agree 6=Strongly Agree

S/N	Perceived Usefulness (PU)	SD	D	SLD	SLA	A	SA
		1	2	3	4	5	6
1	The electronic advance directive forms are readily available to use for patient care.						
2	The electronic advance directive form enhanced prompt decision making for patients' end-of-life care.						
3	The electronic advance directive form makes it easier to follow patients' directives for end-of-life care.						
4	The electronic advance directive form gives me greater control over the advance care planning for patients.						
5	The electronic advance directive form enhances my effectiveness in patients' end-of-life care.						
	<b>Perceived Ease of Use (PEOU)</b>						
6	My interaction with the electronic advance directive in the EHR has been clear and understandable.						
7	Overall, the electronic advance directive in the EHR is easy to use.						
8	Learning to use electronic advance directive in the EHR was easy for me.						
9	I am able to confidently use the electronic advance directive in the EHR.						
10	I am rarely frustrated when using the electronic advance directive in the EHR.						
11	The electronic advance directive in the EHR is difficult to use.						
12	The advance directive form in the EHR is easy to locate and access.						
13	I have the knowledge to use the electronic advance directive in the EHR						
14	I am frequently frustrated when using the advanced directive in the EHR						
	<b>Behavioral Intention to Use (BIU)</b>						
13	I intend to make use of the electronic advance directive form in the EHR for End of Life situations, when needed						
14	To the extent possible, I would use electronic advance directives in my patient care and management frequently						
15	I intend NOT to use electronic advance directives in the EHR to provide healthcare to patients as often as needed						

<b>Actual System Usage (SU)</b>							
16	Considering the most recent situations where you had a need for getting information on advance directives for a patient, how often did you use the Electronic advance directive form in the EHR?	Never	Rarely (<20% of cases)	Sometimes 20-50% of cases	Often >50-80%	Very Often >80%-100%	
17	On average, how many hours do you use the system each week.	Never	Rarely <1 hours	Sometimes 1-2 hours	Often 3-4 hours	Very Often > 4 hours	

## Appendix B: Recruitment letter

### Recruitment Letter

Sinclair School of Nursing  
University of Missouri  
Columbia, MO

Bunmi Folarinde, RN, MSN, PhD(c)  
Phone: (404) 333-7652  
E-Mail: byff48@mail.missouri.edu

Fall, 2016

Dear Physicians, Nurses, Social Workers/Case Managers,

You are receiving this letter because you are a healthcare provider such as nurses (administrator/supervisor, RN, LPN), nurse practitioners, physicians (attending, fellows, and residents), social workers, and case managers working in the clinical areas in oncology units (10A, 10B, and 9A) at Grady Health System, Atlanta, Georgia.

I am a doctoral candidate at Sinclair School of Nursing, University of Missouri, Columbia, Missouri, who will be conducting a research this semester. The title of my project is, "Exploring Perceptions of Healthcare Providers on the Use of Electronic Advance Directive Forms in the EPIC Electronic Health Records (EHRs)".

This research will involve giving you a questionnaire. The questionnaire is not intended to disrupt your work operations, so please take your time in filling it out. The questionnaire can be completed during the break, lunch time, and other times that are convenient for you. Also, please feel free to ask question at any time while you are completing the questionnaire.

The confidentiality is protected through the anonymization of all collected data. These will be available to both online and face-to-face participants. There will be no data collection of identified health information. The data collected will be encrypted, the hardcopy will be locked in a secured cabinet and the softcopy will be saved in a password protected mode in the computer system.

There will be no any anticipated physical, financial, legal or other risk to the participants in this study. Participating in this study is voluntary. You can refuse to participate in this project at any time. However, your participation will help to contribute to the knowledge of what we know about healthcare workers and advance directives. If you are uncertain or uncomfortable participating in this research, you have the right not to. Please note that participation in this survey will not have any impact on your job.

I appreciate your time in assisting me in completing my dissertation research and I look forward to working with you in the next few months.

Thank you,

Sincerely,



Bunmi Folarinde, RN, MSN, PhDc

## Appendix C: Research Code Description

### Terms Description

S/N	Term	Description
1	PI	Principal Investigator
2	AD	Advance Directive
3	EHR	Electronic Health Records
4	PU	Perceived Usefulness
5	PEOU	Perceived Ease of Use
6	BIU	Behavioral Intention to Use
7	SU	Actual System Usage
8	EoL	End-of-life
9	GHS	Grady Health System
10	RN	Registered Nurse
11	LPN	Licensed Practical Nurse
12	MD	Medical Doctor
13	TAM	Technology Acceptance Model

### Code Definition and Description

S/N	Code	Definition
1	Gender	0 = Male 1 = Female 2 = Others
2	Age	1 = < 30 2 = 30 – 39 3 = 40 – 49 4 = 50 – 59 5 = > 60
3	Ethnicity	1 = Caucasian 2 = African American 3 = Hispanic 4 = Native American 5 = Asian 6 = Others
4	Religions	1 = Christianity 2 = Jewish 3 = Muslim 4 = Buddhist 5 = Atheist 6 = Others
5	Role	1 = MD/Physician (primary, attending, fellow, resident) 2 = Nurse Practitioner 3 = Nurse (RN, LPN) 4 = Administrator 5 = Social Worker 7 = Case Manager 8 = Others
6	Years of Experience in clinical practice (in years)	1 = less than 1 2 = 1 – 5 3 = 5 – 10 4 = 10 – 15 5 = Above 15
7	Educational Levele	1 = Diploma 2 = Associate degree 3 = Bachelor degree 4 = Master degree 5 = Doctorate 6 = Others
8	Departments	1 = 10A inpatient oncology unit 2 = 10B Cancer Clinic 3 = 9B Breast Cancer Clinic 4 = Grady Primary Care Center 5 = Internal Medicine 6 = Other

## Appendix D: University of Missouri Institutional Review Board Approval



**Institutional Review Board**  
University of Missouri-Columbia

190 Galena Hall; Dc074.00  
Columbia, MO 65212  
573-882-3181  
irb@missouri.edu

September 30, 2016

Principal Investigator: Bunmi Y Folarinde, PhD Nursing  
Department: University of Missouri/Sinclair School of Nursing

Your Exempt Application to project entitled Exploring Perceptions of Healthcare Providers on the Use of Electronic Advance Directive Form in the Epic Electronic Health Record (EHR) was reviewed and approved by the MU Institutional Review Board according to the terms and conditions described below:

IRB Project Number	2006821
IRB Review Number	220016
Initial Application Approval Date	September 30, 2016
IRB Expiration Date	September 30, 2017
Level of Review	Exempt
Project Status	Active - Open to Enrollment
Exempt Categories	45 CFR 46.101b(2)
Risk Level	Minimal Risk

The principal investigator (PI) is responsible for all aspects and conduct of this study. The PI must comply with the following conditions of the approval:

1. No subjects may be involved in any study procedure prior to the IRB approval date or after the expiration date.
2. All unanticipated problems, adverse events, and deviations must be reported to the IRB within 5 days.
3. All changes must be IRB approved prior to implementation unless they are intended to reduce immediate risk.
4. All recruitment materials and methods must be approved by the IRB prior to being used.
5. The Annual Exempt Form must be submitted to the IRB for review and approval at least 30 days prior to the project expiration date. If the study is complete, the Completion/Withdrawal Form may be submitted in lieu of the Annual Exempt Form
6. Maintain all research records for a period of seven years from the project completion date.
7. Utilize all approved research documents located within the attached files section of eCompliance. These documents are highlighted green.

If you are offering subject payments and would like more information about research participant payments, please click [here](#) to view the MU Business Policy and Procedure:

Appendix E: Affiliation Agreement between University of Missouri and Grady Health System



## Memorandum

**To:** Rosiland Harris, PhD  
Director of Nursing Education Practice and Research

**From:** Timothy Jefferson, Esq.   
Executive Vice President of Legal Affairs / General Counsel

DeAngelo Norris, Esq.   
Senior Associate General Counsel

**Date:** 10/25/2016

**Re:** **Sinclair School of Nursing (University of Missouri) Affiliation Agreement**

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This office has reviewed the above contract documents. Based on our review, we find that the documents are legally acceptable for signature and execution. Further, we find that the documents are consistent with Grady Health System's goals and objectives. Once the contract has been fully executed, please forward a signed copy to this office for our files.

If you have any questions regarding this matter, please let me know.

Appendix F: Nursing Research Council (NRC) at Grady Health System Approval

**Grady Health System  
Nursing Research Council  
Proposal Reviewer Critique Form**

Title of Research Proposal: Exploring Perceptions of Healthcare Providers on the Use of Electronic Advance Directive Forms in the EPIC Electronic Health Records (EHRs)

Nurse Researcher(s): Bunmi Yemisi Folarinde

Nurse Researcher(s) Email Address: [byff48@mail.missouri.edu](mailto:byff48@mail.missouri.edu) or [bfolarinde@gmh.edu](mailto:bfolarinde@gmh.edu)

Researcher(s): Contact #: 404-333-7652

IRB#: 2006821      IRB Expiration Date: 09/30/2017      University: University of Missouri, Columbia, MO

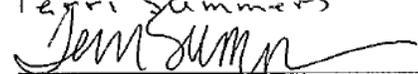
Patient Care Unit(s): 10A, 10B, and 9A

Research Proposal Checklist		YES	NO
<b>Purpose &amp; Statement of the Problem</b>			
Research problem(s) and significance clearly stated?		X	
Purpose/aim of the study clearly stated?		X	
<b>ROL/Research Question/Hypothesis/Conceptual Framework</b>			
Review of Literature (ROL) comprehensive?		X	
References comprehensive and adequate?		X	
Conceptual framework included?		X	
Hypotheses or research questions flow from the ROL?		X	
<b>Methodology</b>			
Research Design identified?		X	
Study design appropriate to the research questions?		X	
Nursing population being studied: RNs & Nurse Case Managers			
What is the nurse's role in this study? Complete questionnaire.			
Data collection tool contained within the proposal?		X	
Data collection tools are reliable & valid?		X	
Are the individuals who will collect data identified?		X	
Are their qualifications appropriate for the study?		X	
Are the data analysis plans and techniques detailed?		X	
Grady Nursing Staff responsibility in data collection: Complete questionnaire.		N/A	
Care provided by Grady Nursing Staff (med admin, vital signs, etc):		N/A	

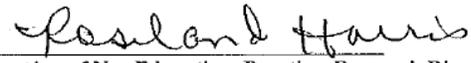
<b>Informed Consent</b>		
Consent Form and procedures within the proposal? Recruitment Letter	X	
Is the study confidential and safe?	X	
Has Human Subject Protection been considered?	X	
Are potential risks and benefits identified?	X	
<b>Cost</b>		
Will the hospital be providing resources and/or staff? If yes, explain:		X
Will human subjects incur any costs? If yes, explain:		X
<b>Results &amp; Conclusions</b>		
Are limitations of the study identified?	X	
Will the study yield results that will benefit nursing practice?	X	
Will the results benefit Grady Health System?	X	
Plan for dissemination: Grady Nursing Research Journal Club, scientific conferences/meetings		
Will the results be published? Where? Peer-reviewed journals.		
<b>Grady Research Oversight Committee Application</b>		
Unit Manager's Approval Form: 9B, 10A & 10B	X	
Include Research Oversight Committee Application	X	
Your recommendations for approval: <input checked="" type="checkbox"/> Full Approval for Research Study <input type="checkbox"/> Approval with modification as specified below <input type="checkbox"/> Disapproval with rationale specified below <input type="checkbox"/> Approval for Quality Improvement Project <input type="checkbox"/> Approval Quality Improvement Project with <input type="checkbox"/> Modifications as specified below		

Comments:

*Researcher must submit final results to the NRC.*

Tegri Summers  
  
 Signature of NRC Reviewer

11/16/16  
 \_\_\_\_\_  
 Date

  
 Signature of Nsg Education, Practice, Research Director

11/17/16  
 \_\_\_\_\_  
 Date

  
 Signature of Chief Nursing Officer

11/17/16  
 \_\_\_\_\_  
 Date

**Director/Manager Recommendations Regarding Nursing Research Proposal**

Research Study Title: Exploring Perceptions of Healthcare Providers on the Use of Electronic Advance Directive Forms in the EPIC Electronic Health Records (EHRs)

Nurse PI: Bunmi Yemisi Folarinde

Name of Director/Manager: Esole Carswell

Unit: 10A Contact #: 404 414-3468

**Director/Manager Review:**

Is the study appropriate for your area?

yes

Are there questions regarding the scientific merit of the study?

NO

Are there concerns regarding the feasibility of the study?

NO

Are there any suggestions you have for the nurse PI?

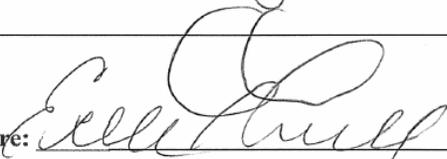
Not at the moment

Are there any suggestions regarding how to encourage participation in the study?

Not at this time

Does this research have your approval and support? Why not?

Approval is granted.

Signature:  Date: 10/3/14

**Director/Manager Recommendations Regarding Nursing Research Proposal**

Research Study Title: Exploring Perceptions of Healthcare Providers on the Use of Electronic Advance Directive Forms in the EPIC Electronic Health Records (EHRs)

Nurse PI: Bunmi Yemisi Folarinde

Name of Director/Manager: Pooja Mishra

Unit: 10B, 10A, 9B Contact #: 404-271-1039

**Director/Manager Review:**

Is the study appropriate for your area?

Yes

Are there questions regarding the scientific merit of the study?

No

Are there concerns regarding the feasibility of the study?

No survey completion needed, the proposed units would need to have high return rate to meet objective.

Are there any suggestions you have for the nurse PI?

No

Are there any suggestions regarding how to encourage participation in the study?

No

Does this research have your approval and support? Why not?

Yes, provided the survey does not disrupt operations of the departments.

Signature: Pooja Date: 10/3/16

Appendix G: Research Financial Clearance at Grady Health System Approval



**Grady  
Research - Financial Clearance Form**

Office of Grants Administration  
50 Hurt Plaza, Suite 301  
Atlanta, Georgia 30303

<b>INSTRUCTIONS:</b>													
<p>Financial Clearance is required for ROC review (see <a href="#">ROC Application Section H</a>). Please do the following to obtain Financial Clearance:</p> <ul style="list-style-type: none"> <li>• Complete this type-able form based on the appropriate Submission Category below. Provide an answer to each question, indicate 'N/A' as necessary.</li> <li>• Submit this form as a MS Word document to <a href="mailto:grants@qmh.edu">grants@qmh.edu</a> for review and approval.</li> <li>• Append Support Documents. Required Support Documents are listed at the end of page 3.</li> <li>• Provide additional clarification and documentation as necessary and/or requested.</li> <li>• Contact the Office of Grants Administration (OGA) with any questions at <a href="mailto:grants@qmh.edu">grants@qmh.edu</a> or 404.616.4731. Please allow 7-10 days for processing.</li> </ul> <p style="text-align: center; background-color: yellow;"><b>NOTE: Only the current version of the Financial Clearance form will be accepted for review.</b> Current forms available at <a href="http://www.gradyhealth.org/static/office-of-grants-administration">http://www.gradyhealth.org/static/office-of-grants-administration</a></p>													
<b>SUBMISSION CATEGORIES</b>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> <b>New</b> (Initial Financial Clearance Review) – Complete this form in its entirety indicating N/A as needed. Completion of the Billable Items/Services Section is only required for services being provided on the Grady Campus. Provide explanatory comments as necessary (page 3). A current IRB expiration Date is required for review/ approval.</li> <li><input type="checkbox"/> <b>Renewal</b> – Provide current study information (pages 1 &amp; 2) &amp; complete the Annual Renewal Section (page 3). If any study information is being amended, provide a summary of changes in the Amendment Section (page 3). A current IRB expiration Date required for approval. Include Support Documents as applicable (see page 3).</li> <li><input type="checkbox"/> <b>Modification / Amendment</b> – Update this form appropriately &amp; provide a summary of changes in the Amendment Section (page 3). Include Support Documents as applicable (see page 3).</li> </ul>												
<b>CONTACT INFORMATION</b>													
<p>Requesting Organization: <input checked="" type="checkbox"/> Grady <input type="checkbox"/> CHOA <input type="checkbox"/> Emory <input type="checkbox"/> GSU <input type="checkbox"/> Morehouse <input checked="" type="checkbox"/> Other: <u>University of Missouri IRB</u></p> <p>Principal Investigator: <u>Bunmi Folarinde</u> E-mail: <u>byff48@mail.missouri.edu</u> Phone: <u>404-333-7652</u></p> <p>Research Coordinator: <u>Gregory Alexander</u> E-mail: <u>AlexanderG@missouri.edu</u> Phone: <u>573-882-9346</u></p> <p>Billing Manager: _____ E-mail: _____ Phone: _____</p> <p>Other: _____ E-mail: _____ Phone: _____</p> <p style="text-align: center; background-color: yellow;"><b>Study Communication Will Only Be Distributed to Individuals Listed Above. Indicate Additional Contact Persons In "Other"</b></p>													
<b>STUDY INFORMATION</b>													
<p>Full Study Title: <u>Exploring Perceptions of Healthcare Providers on the Use of Electronic Advance Directive Forms in the EPIC Electronic Health Record (EHR)</u></p> <p>Study Acronym: <u>Dissertation Research</u></p> <p>IRB Number: <u>2006821</u> Current IRB Expiration Date: <u>09/30/2017</u></p> <p style="text-align: center; font-size: small;"><i>*The IRB Expiration Date is Required for Processing. If an IRB Exemption was granted Indicate "Exempt" and provide Exemption determination letter</i></p> <p>Funding Source: <input type="checkbox"/> Federal <input type="checkbox"/> Industry <input type="checkbox"/> Foundation/Non-Profit  <input checked="" type="checkbox"/> Not Funded <input type="checkbox"/> ACTSI <input type="checkbox"/> Other: _____</p> <p>Sponsor Name: <u>N/A</u></p> <p>Estimated Total Number of Subjects <u>at Grady: 110</u> Length of Study: _____</p> <p><b>Study Type:</b></p> <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Clinical Trial – NCT# _____</td> <td><input type="checkbox"/> Qualitative</td> <td><input type="checkbox"/> Medical Records/ Chart Review</td> </tr> <tr> <td><input type="checkbox"/> Clinical Research</td> <td><input type="checkbox"/> Registry</td> <td>Date Range of Review: From _____ To _____</td> </tr> <tr> <td><input checked="" type="checkbox"/> Survey/ Questionnaire</td> <td><input type="checkbox"/> HUD or Exempt</td> <td><input type="checkbox"/> Tissue / Sample Collection</td> </tr> <tr> <td><input type="checkbox"/> Observational</td> <td></td> <td><input type="checkbox"/> Other: _____</td> </tr> </table> <p><b>Location of Research:</b></p> <p>Where Subjects Will Be Seen:</p> <p><input checked="" type="checkbox"/> Main Hospital (Department/Floor): <u>10A, 10B, 9A</u> <input type="checkbox"/> Infectious Disease Center / Ponce de Leon Center  (Oncology Departments) IDP Admin/Office Space Needed <input type="checkbox"/></p> <p><input type="checkbox"/> Grady CIN/ACTSI/GCRC <input type="checkbox"/> Other: _____</p> <p><input type="checkbox"/> Neighborhood Clinic</p> <p>Will the majority (50% or more) of research / study activity be performed at a Grady location? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  If No, specify what activity will occur at Grady (i.e. recruitment): _____</p>		<input type="checkbox"/> Clinical Trial – NCT# _____	<input type="checkbox"/> Qualitative	<input type="checkbox"/> Medical Records/ Chart Review	<input type="checkbox"/> Clinical Research	<input type="checkbox"/> Registry	Date Range of Review: From _____ To _____	<input checked="" type="checkbox"/> Survey/ Questionnaire	<input type="checkbox"/> HUD or Exempt	<input type="checkbox"/> Tissue / Sample Collection	<input type="checkbox"/> Observational		<input type="checkbox"/> Other: _____
<input type="checkbox"/> Clinical Trial – NCT# _____	<input type="checkbox"/> Qualitative	<input type="checkbox"/> Medical Records/ Chart Review											
<input type="checkbox"/> Clinical Research	<input type="checkbox"/> Registry	Date Range of Review: From _____ To _____											
<input checked="" type="checkbox"/> Survey/ Questionnaire	<input type="checkbox"/> HUD or Exempt	<input type="checkbox"/> Tissue / Sample Collection											
<input type="checkbox"/> Observational		<input type="checkbox"/> Other: _____											

Research Financial Clearance (continued)

This study involves Billable Services that will NOT occur at a Grady location:  Yes  No  
 Comments: N/A

Principal Investigator: Bunmi Folarinde

IRB#: 2006821

**SUBCONTRACTS & AGREEMENTS**

Will a subcontract or other contractual agreement will be required for the conduct of this study?

Yes  No  Unknown

**DEVICES, EQUIPMENT & SUPPLIES**

This study requires GHS to use, receive for free or to purchase a Device, Equipment and/or Supplies:

Yes  No **If Yes**, check all applicable below

- Device(s) – Complete the OGA Device Form (*Submission for initial review ONLY*)
- Equipment – Complete the OGA Equipment Form (*Submission for initial review ONLY*)
- Supplies – Complete the OGA Device Form (*specify items, excluding Pharmacy items/supplies*): \_\_\_\_\_

**Note** - Devices, equipment and related supplies that will be used and/or stored on Grady's Campus must comply with Grady's policies for registration, inspection, tagging and/or approval for use.

- The referenced Device & Equipment forms are **ONLY** required for the initial submission /review for the use of Non-Grady devices/ equipment/ supplies. Confirmation of GHS' Clin/Engineering or VAC approval is required at the time of study renewal.

**STOP** If Your Study Does NOT Include Grady Billable Items or The Use Of Grady Resources / Services.  
 To Provide Annual or Amendment Information skip to Page 3 **STOP**

**GRADY BILLABLE ITEMS / SERVICES**

**Investigational Drug Services (IDS):**

Does this study include Investigational Drug or other Pharmacy Services at Grady?  Yes  No  
**If Yes**, obtain and provide a copy of the Pharmacy Estimate prepared by Grady's Investigational Drug Services

Investigational New Drug Number (IND): \_\_\_\_\_

Specify Other Pharmacy Services that may be required: \_\_\_\_\_

**Investigational / Clinical Services:**

**If this study involves Investigational / Clinical Services a response MUST be provided for the following questions**

Does this study include Investigational / Clinical Services that will be billed to the Sponsor?  Yes  No  
*(i.e. Cardiology, Laboratory, Pathology, Radiology)*

**If Yes**, provide the CPT code, description and quantity for each item/service below

Does this study include Routine Clinical Services that are billable to Insurance?  Yes  No  
*(i.e. Medicare or Third Party Payers)*

**If Yes**, Check the "Insur" box beside the item(s) / service(s) below

This study includes in-patient services:  Yes  No

BILLABLE ITEMS / SERVICES					
An additional page for billable items/ services is provided at the end of this document					
CPT Code(s)	Description(s)	Insur	Quantity (Per Subject)	EAP Code (GHS Use Only)	Price per Unit (GHS Use Only)
		<input type="checkbox"/>			
		<input type="checkbox"/>			
		<input type="checkbox"/>			
		<input type="checkbox"/>			
		<input type="checkbox"/>			

**GRADY SERVICES / RESOURCES**

Does this study require the use of Grady Services or Resources that are not routinely charged in Epic?

Yes  No **If Yes**, Identify **ALL** applicable departments and provide a brief explanation of services /resources required:

- Grady Information System (IS) (*i.e. data extraction*): \_\_\_\_\_
- Health Information Management (*i.e. medical records retrieval*): \_\_\_\_\_
- Grady Nursing Staff (*i.e. staff time/ services*): \_\_\_\_\_
- Other: \_\_\_\_\_

**Research Financial Clearance (continued)**

**Additional Comments** (Provide additional comments or clarification regarding the billable items/services for this study)

**ANNUAL RENEWAL INFORMATION**

Number of Grady subjects enrolled to date (# medical records or data accessed / samples collected): N/A

Study Status: Check All Applicable Study Status Descriptors

- Ongoing   
  Closed to Enrollment   
  Data Analysis Only   
  Sponsor or IRB Close Out Notification  
 Participant Clinical Visits Complete   
  Participant Clinical Pharmacy Complete   
  Other: \_\_\_\_\_

**AMENDMENT INFORMATION**

Briefly specify the changes that are part of this submission (i.e. contact information, funding/sponsor, billable items) Please attach the IRB Approval or other support document(s). Specify CPT codes etc for billable items above.

N/A

OFFICE OF GRANTS ADMINISTRATION USE ONLY	
<b>OTHER COSTS / FEES</b>	
<b>Administration</b>	<input type="checkbox"/> OGA Administrative Fee for Industry Sponsored Studies \$ _____ <input type="checkbox"/> Investigational Drug Services Estimate (See attached invoice) dated _____
<p><b>Disclaimer:</b> This Financial Clearance is being granted based on the information provided to Office of Grant Administration (OGA) by the Study Principal Investigator (PI) / Research Personnel. It is the responsibility of the PI to resubmit this application in the event that the above information changes, particularly with modifications to contact persons, funding, billable items/services and utilization of Grady resources (staff, supplies, equipment, etc.).</p> <p>The Sponsor is responsible for payment of ALL Investigational Drug Services and other Fees; Items/Services charged to patient accounts related to research activity.</p>	
<b>Grady Payor Code:</b>	
<b>OGA Approval:</b>	Yvette Benjamin, Grants Research Analyst
<b>Date Approved:</b>	10.12.16
<b>OGA Comments:</b>	

## Appendix H: Research Overview Committee (ROC) at Grady Health System Approval



**Research Oversight Committee (ROC)**  
Division of Medical Affairs  
80 Jesse Hill Jr. Drive SE  
P. O. Box 26118, Atlanta, GA 30303

**Research Administration**  
Office: 404-616-7757  
Fax: 404-616-2119

**PI Name: FOLARINDE, BUNMI**  
C/O: FOLARINDE, BUNMI  
Organization:  
Department: Nursing  
Office: (404) 333-7652  
Fax:

Date: 10/11/2016

**IRB#: 2006821**  
IRB Expires: 9/30/2017  
ROC Expires: 10/30/2017  
CT Plan Code: N/A

**Protocol Title:** : Exploring Perceptions of Healthcare Providers on the Use of Electronic Advance Directive Forms in the EPIC Electronic Health Record (EHR)

**Re: Research Protocol: NEW**

The Grady Research Oversight Committee (ROC) has reviewed and **APPROVED** the documents submitted for your research protocol.

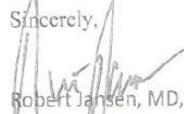
**Please note the ROC Expiration date listed above.** Thereafter, continued approval is contingent upon the submission of a renewal form that must be reviewed and approved by the ROC prior to the expiration date of this study.

**Please note the clinical trial insurance plan code assigned to your study, IF APPLICABLE.** You will need to use this code when registering patients for Grady services related to this research protocol.

Also, please notify the ROC when this proposal has been terminated or completed. All inquiries and correspondence concerning this protocol must include the IRB # and the name of the Principal Investigator. Any further reviews by the IRB pertaining to this proposal should be submitted to the ROC. This includes: Approved IRB Renewals, Modifications (Protocol, Informed Consent, Personnel, etc.) and any Adverse Events.

The committee would be interested in receiving the report of your research results and copies of any publications or presentations resulting from this research.

Sincerely,

  
Robert Jansen, MD, MBA  
Executive Vice President  
Chief Medical Officer & Chief of Staff

Confidential Note: The information contained in this facsimile message is legally privileged and confidential and is intended for use only by the individual(s) or entities named. Any dissemination, distribution or copying of this document is strictly prohibited. If you received this document in error, please notify us by telephone and return the original message to us at the address above or via the United States Postal Service.

## VITA

Bunmi Folarinde was born in Arogbo, Ondo State, Nigeria in 1976. Bunmi's parents started out their carriers as tailors, but her mother, Ms. Titilayo Samuel is currently a trader, while her father, Mr. Blessing Twatimi, is currently a full time pastor. Bunmi was raised and brought up by her mother in Offa, a village located in Kwara State, Southern part of Nigeria. Bunmi attended St. Cyprian primary school and Olalomi Comprehensive Secondary school, both located in Offa, Kwara State, Nigeria, 1986 - 1992. Bunmi was admitted to Federal University of Technology, Minna, Niger State, Nigeria in 1996, where she obtained her first bachelor degree in Maths/Computer Science in 2000. Upon graduation from college, Bunmi did her National Youth Service at Central Bank of Nigeria for one year, after which she got a job with National Open University of Nigeria in the IT department for about six years (2002 - 2006) as a Knowledge Management Technologist.

In December 2005, Bunmi won a visa lottery and received an invitation to come to the United State of America as a permanent resident. In June 2006, Bunmi relocated to Atlanta, Georgia with her family where they currently reside. Bunmi started her career as a certified nursing assistant (CNA) at Christian City, Nursing Home, in Union City, GA in 2007. While working as a CNA, Bunmi decided to go back to school to study nursing in January 2008. Bunmi obtained her second degree in Bachelor of Nursing from Clayton State University, Morrow, Georgia in December, 2010 and her Master degree in Leadership in Nursing Innovation with concentration in Nursing Informatics from Georgia State University, Georgia in December, 2013. Bunmi started her professional nursing career as a staff nurse at Grady health System in Atlanta, GA in August 2011.

She later joined Piedmont Fayette Hospital as a staff nurse, but later assumed the position of nursing administrative supervisor for a very brief period after which, she decided to proceed to University of Missouri, Columbia for her PhD program in June 2014. Bunmi had the privilege and honor to have had Prof. Gregory Alexander as her program advisor; Prof. Colleen Galambos, Prof. Bonnie Wakefield, and Prof. Amy Vogelsmeier as program committee members, and of course, Prof. Deidre Wipke-Tevis as the the PhD program director.

While working as a nurse at Piedmont Fayette Hospital, Fayetteville, GA, Bunmi has been known to be very dedicated and compassionate to her patients to the call. To Bunmi, nursing is more than just a profession, but a calling. She gives her heart to what she does and takes care of patients unconditionally. Bunmi was nominated for the award by a patient who recognized her for providing excellent patient care and her pleasant demeanor. The patient praised Bunmi for "being personable, efficient, and making a point to go beyond the call of duty to make a patient feel comfortable and well taken care of." Bunmi won the DAISY Award for Extraordinary Nurses in April, 2014 at Piedmont Fayette Hospital. Bunmi is currently working as a full-time senior nurse at Grady Health System, Atlanta, GA.

To God be the Glory!!! Amen!