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Factors Associated with Access to Palliative Care in a Large Urban Public Teaching Hospital with a Formal Hospital-Based Palliative Care Program

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A dissertation submitted in partial fulfillment of the requirements for the degree of
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by

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ABSTRACT

FACTORS ASSOCIATED WITH ACCESS TO PALLIATIVE CARE IN A LARGE URBAN PUBLIC TEACHING HOSPITAL WITH A FORMAL HOSPITAL-BASED PALLIATIVE CARE PROGRAM

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Health Related Sciences at Virginia Commonwealth University.

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Hospital-based specialist palliative care services are designed to address the needs of critically ill patients by psychosocial and spiritual support, improving symptoms management, and offering discussions on goals of care. Integrating palliative care upstream in the care continuum for patients who eventually die in the hospital will help to address the many individualistic needs of the critically ill patient. The diffusion of specialist hospital-based palliative care services requires an understanding of patterns of utilization by patients. The purpose of this study was to examine the population characteristics of decedents who may or may not have utilized specialist palliative care services in a hospital setting in order to develop a model of predictors of access to specialist palliative care services.

The basic constructs of this study are grounded in the Behavioral Model of Health Services Use. Potential access is measured in terms of population characteristics, which include predisposing characteristics, enabling resources, and evaluated need. Building on this theoretical model, the study sought to better understand equitable and inequitable access to specialized palliative care services and to define which predictors of realized access were dominant. The research question asked was: What are predictors of access to specialized palliative care within a large urban public teaching hospital?

A model of access to a palliative consult and a predictor of access to a palliative care unit were explored. Findings from this study revealed that factors encouraging access to a palliative care consult include older age, White non-Hispanic ethnic membership, a diagnosis with solid cancer and insurance. Factors encouraging access to a palliative care unit include older age, gender (female), insurance, and either a solid cancer or hematologic malignancy diagnosis.

CHAPTER 1: INTRODUCTION

Introduction to the Problem

The purpose of this study is to understand predictors of admission to a formal hospital-based palliative care program within a large urban public teaching hospital. As the population ages, the proportion of adults of working age decreases in proportion to older adults. Demand for caregivers, both formal and informal, will increase and health care systems will become more burdened with families who cannot afford private long-term care. With fewer informal caregivers and more reliance on hospitals for near death conditions, the demand for hospital-based palliative care will increase. The systemic impact of an increasing number of older adults who require care at end-of-life will make hospital-based palliative care services more cost effective and will produce better health outcomes and satisfaction with hospital care (Fisher, Wennberg, Stukel, Gottlieb, Lucas & Pinder, 2003).

In a 2008 report from the Center to Advance Palliative Care entitled: America’s Care of Serious Illness: A State-by-State Report Card on Access to Palliative Care in our Nation’s Hospitals, the authors report that despite a doubling of palliative care programs at hospitals with 50 or more beds between 2000 and 2006, not only do millions of Americans with serious illness lack access to palliative care, but the availability of palliative services varies considerably by region and state. Access is influenced by market characteristics including hospital size, regional characteristics and geographic location.

Research Objectives

Little is known about the population characteristics of hospital decedents who have access to specialized care services. Patterns of referral to specialized palliative care services are not well understood. This study will seek to understand patterns of access to palliative care, and why some patients who can be identified as appropriate for palliative care do not utilize this care.

Research Problem

This study describes the effect of individual and community characteristics on whether adults with similar disease trajectories, who differ by predisposing, enabling and need characteristics, receive specialized hospital-based palliative care. The overarching research question addressed in this study is: Why are some people who are at end-of-life and require hospitalization directly admitted to a Palliative Care Unit, whereas others in the same situation die in hospital with a palliative care consult, and still others receive no specialized palliative care services whatsoever. A related question is to better understand whether equitable access to palliative care is provided. Access is especially important for persons who seek care in academic medical centers where the diffusion of innovations in palliative care research is critical, yet currently there is a lack of understanding of which factors influence a person’s use of specialized palliative care services.

Purpose Statement

The purpose of this research is to expand the existing knowledge of access to specialized palliative care services in a hospital-based palliative care unit through a cross-sectional retrospective study of decedents in a large urban public teaching hospital. If characteristics that affect the decision making process to utilize specialized palliative care can be identified, then interventions to alter the patterns of usage may be improved and expanded. By exploring the factors associated with patient use of the palliative care unit, including the methods of referral into the unit, insight can be gained about how to improve access to an increasingly growing segment of the U.S. population who can benefit from these services.

Research Question

This study answers the following question: **What are the predictors of access to specialized palliative care within a large urban public teaching hospital?** Two models are evaluated, each with a specific objective:

Objective 1: Analysis of Decedents who received a Palliative Care Consult at Virginia Commonwealth University (VCU) Medical Center.

Objective 2: Analysis of Decedents who have been admitted to the Palliative Care Unit at VCU Medical Center.

Theoretical Guidance

The Andersen and Davidson 2001 (2007) version of the Behavioral Model of Health Services Use (Andersen, 1995) is used as the framework to understand how patterns of utilization occur when the availability of a dedicated palliative care unit or palliative care consult team is introduced to a hospital. Population characteristics are categorized as sociodemographic characteristics, enabling personal resources, and evaluated need. Environmental factors address the potential availability of palliative care for the entire population of decedents.

Design and Methods

The Chi-square test for independence will be used to determine by frequency of cases, whether categorical variables are related. Logistic regression will be used to predict a categorical dependent variable on the basis of continuous and/or categorical independents; to determine the effect size of the independent variables on the dependent variable; to rank the relative importance of the independents; and to understand the impact of control variables. Two specific models will be developed, one with palliative care consult as the dependent variable, and the other with admission to the palliative care unit as the dependent variable.

Summary

Layout of Subsequent Chapters

This chapter presents the purpose of the study. Chapter Two provides a literature review of palliative care, selected variables of interest and the theoretical framework to guide this study. Chapter Three outlines the methodology used to test the research question posed. Chapter Four provides results of the analysis. Chapter Five provides discussion of the findings, highlights the implications of the results, and offers suggestions for future research.

CHAPTER 2: LITERATURE REVIEW

Introduction

This chapter lays the groundwork to explore palliative care and define who uses and who may benefit from specialized hospital-based palliative care programs. The chapter begins with an initial review of approaches to study the nature and process of death and dying, the hospice movement and the influence of hospice on palliative care in the United States. An overview of palliative care with a descriptive analysis of patients who use palliative care and research to date on specialized hospital-based palliative care is then provided. A synopsis of gaps in the palliative care literature is then offered in connection with how the Behavioral Model of Healthcare (Andersen, 1995; Andersen & Davidson, 2001) can be used to better understand access to palliative care. The chapter concludes with the research questions and hypotheses to be used in this study.

The Nature of Death and Dying in the United States

The nature and process of dying and death in the United States changed in the 20th century. In 1900, most people died from acute illnesses and injuries (Chrvala & Bulger, 2003). Life expectancy rose with environmental and medical advances in the early 20th century. The pattern of diseases changed as the pattern of life expectancy increased. The average life expectancy at birth increased from 47 years in 1900 to approximately 75 years in 2000. By 2009, seven out of every ten deaths in the United States were from chronic disease (National Vital Statistics Reports, 2011) and the average life expectancy was to 78.2 years. According to the National Vital Statistics Reports (Volume 59, Number 4, and March 11, 2011), there were over 2.4 million annual deaths in the United States in 2009. Less than six percent of these were the result of accident, suicide or homicide. The remaining deaths were attributed to pre-existing conditions including heart disease, cancer, cerebral vascular disease, chronic lung disease, dementia, or chronic liver disease (Lamont, 2005). Over 40 percent of all deaths in the United States occur in hospitals, with 72.5 percent of these deaths occurring in adults 65 years of age or older (National Vital Statistics Reports, 2011). For the Medicare population of older persons and persons with disabilities, fifty percent die in hospital. Approximately 20 percent of all deaths in the United States occur in patients who are in the Intensive Care Unit (ICU) or shortly after transfer to another unit (Nelson et al., 2006).

Individual characteristics, disease processes, and local environment indicators help determine whether people with a terminal illness will die in home, hospital, or a long-term care facility. Although the preferred place of death is home (Hays, Galanos, Palmer, McQuoid & Flint, 2001), half of all deaths due to terminal illness occur in acute care facilities (Gruneir et al., 2007). Social support factors such as being married, (Bruera, Sweeney, Russell, Willey & Palmer, 2003) increased number of children, and availability of caregivers, (Watcherman & Sommers, 2006) are predictors of home death and being non-white, and/or less educated are predictors dying in hospital (Weitzen, Teno, Fennell & Mor 2003). The Weitzen study concluded that a rapid physical decline over several months is associated with dying at home, whereas a longer, slower functional decline is associated with dying in a long-term care setting such as a skilled nursing or assisted living facility.

America has been trending away from hospital inpatient death and toward death at home or long-term-care facilities. In 1980, over half of all decedents were inpatients, while 17% of deaths occurred at home, and 16% occurred in long-term care facilities. (Flory, Young-XU, Gurol, Levinsky, Ash & Emanuel, 2004). By 1998, death in the home increased from 17 percent to 22 percent, and nursing home deaths increased from 16 percent to 22 percent. By 2004 a quarter of Americans died at home (National Center for Health Statistics Health, 2009), and hospital inpatient deaths decreased to 37 percent of all deaths in America. However, deaths due to chronic illness occurred almost 50 percent of the time in hospital in 2001 (Gruneir et. al, 2007).

For terminally ill patients, >80% of whom had cancer, Gomes & Higginson (2006) developed a conceptual model of place of death and its determinants (Figure 1). Using a systematic review of 58 studies on place of death the authors found strong evidence for the network of factors that affect the place where patients with cancer die. In the Gomes & Higginson model, place of death is predicted by three different factors, those related to illness, individual and environmental factors.

With respect to factors related to illness, functional status is a prognosis tool for terminally ill patients (Chow, Harth, Hruby, Finkelstein, Wu & Danjoux, 2001) and is often used as a basis for referral to palliative care for the most seriously ill (Teno,

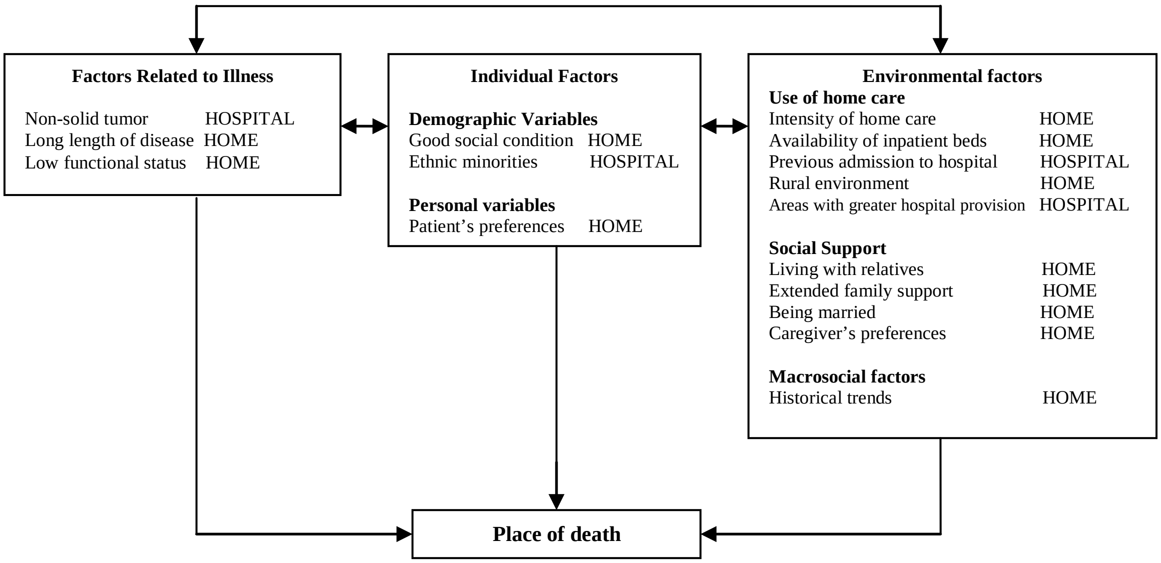


Figure 1. Model of variations of place of death, Gomes & Higginson (2006).

Weitzen, Fennel & Mor, 2001). Whereas patients with many options for treatment, such as those with non-solid tumors for example, are more likely to opt for aggressive care, those with a long disease trajectory and low functional status are more likely to be referred to palliative care near end-of-life (Hunt & McCaul, 1996). Individual factors include the patient's preference for place of death and ethnicity. The availability of home health care and the availability of informal caregivers are environmental factors that lead to home death.

Dying Trajectory Theory, based on Glauser and Strauss's 1968 publication Time for Dying, defines the trajectories of four distinct types of death expectations and the unique relationships within each trajectory. The four trajectories are (a) certain death at a known time, (b) certain death at an unknown time, (c) uncertain death but a known time when the certainty will be established and (d) uncertain death and an unknown time when the question will be resolved.

Glauser and Strauss's (1968) trajectory theory of death suggests that a broad categorization scheme can capture the nature of clinical course before death. In a study of older Medicare descendants, Lunney, Lynn, and Hogan (2002) found four distinct trajectory groups at end-of-life (Figure 2). These trajectories of dying comprised 92 percent of all Medicare deaths. The four groups had distinct patterns of demographics.

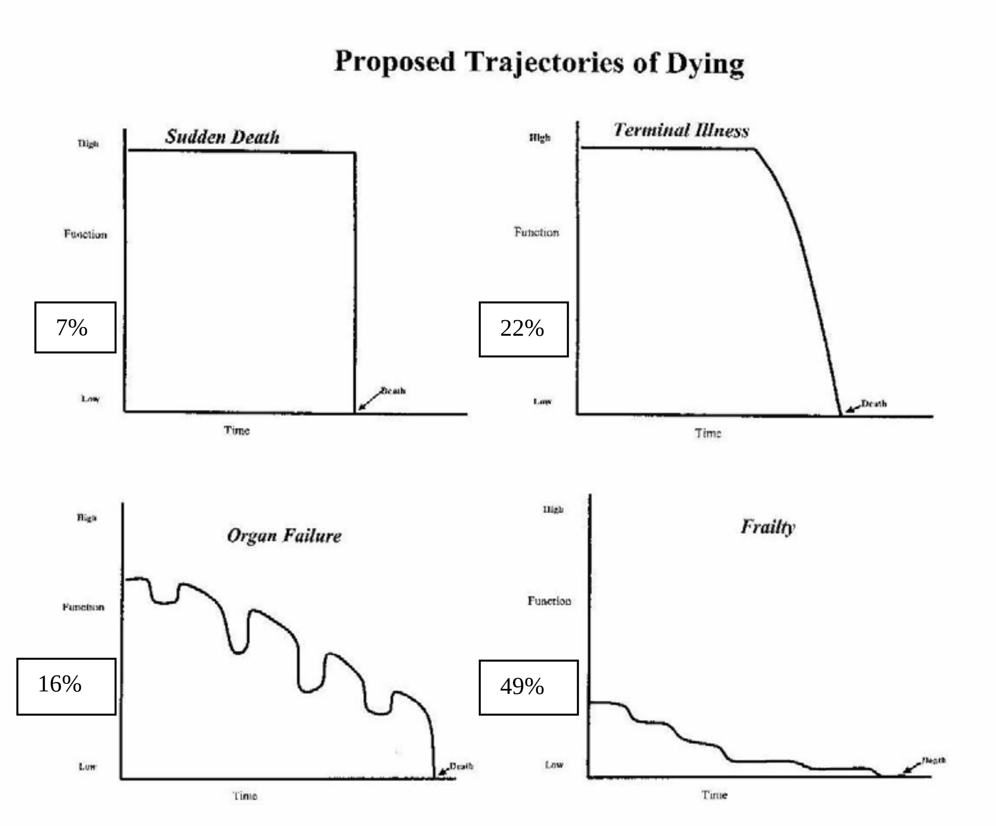


Figure 2. Proposed Trajectories of Dying (Lunney, Lynn and Hogan, 2002)

Sudden death, an uncertain death and an unknown time when the question will be resolved represented seven percent of Medicare deaths. Terminal illness, certain death at a known time, which most often is typical of cancer patients, represented 22 percent of Medicare deaths. Organ failure, an uncertain death but at a known time when the certainty will be established, represented 16 percent of Medicare deaths. Frailty, which is described as experiencing a slow decline, with steadily progressive disability before dying from complications associated with advanced frailty of old age, stroke or dementia, represented 47 percent of Medicare deaths. Almost half of Medicare deaths fall into this trajectory, a certain death at an unknown time.

When looking at the four trajectories of death that comprise the 92 percent of yearly Medicare decedents, the 47 percent of patients who die each year because they are simply frail are the least well served (Buntin, & Huskamp, 2002), because they neither qualify for hospice nor receive long-term psychosocial coverage for supportive care by Medicare. Those patients who die from organ system failure (16%), receive support for medical care but little other psychosocial coverage. Because of the uncertainty of trajectory of death for these patients, they are less likely to qualify for hospice benefits. Patients who die suddenly or quickly in the hospital (7%) are covered by Medicare’s intensive acute care benefits. Medicare coverage for psychosocial care, including spiritual interventions, is mostly only offered to the 22 percent of dying patients defined by hospice payment practices which are related to terminal illness and a certain death at a known time.

A report from the Center for the Evaluative Clinical Sciences at Dartmouth Medical School found that medical costs varied across the nation but quality of care is not necessarily linked to higher-cost care. The report (The Dartmouth Atlas of Health Care,

2008) is based on findings from an examination of Medicare claims from over 4300 hospitals in 306 regions. The study was based on 4.7 Medicare enrollees who died from 2000 to 2005 with at least one chronic illness.

The Dartmouth Atlas report focused on decedents with chronic illness in the last two years of life because seventy percent of Americans die from chronic disease, and ninety percent of the Medicare population's deaths are associated with chronic illness. Findings from the report included a notion of “supply sensitive” care, where the supply of resources was associated with the frequency of use. Better care at the end-of-life was inversely related to an increase in physician visits, hospitalizations, and Intensive Care Unit (ICU) stays among the chronically ill. According to Roemer's Law of Demand (Roemer, 1961), hospital services differ from the general law of supply and demand, where over supply would lower the cost of a hospital bed. Roemer suggested that supply will induce its own demand where a third party (Medicare) practically guarantees reimbursement of usage. In more simplistic terms, a built hospital bed is a filled hospital bed. Similarly with supply sensitive care, a surplus of capacity leads to more treatment rather than better treatment.

By using the Dartmouth population based study to analyze practice variations among regions, benchmarks for evaluating efficiency were achieved based on the use of high quality/low resource regions. In order to adjust for differences in the severity of illness, the study adjusted for age, sex, race and frequency of chronic illness. The prognosis was comparable as all patients died after the interval of observation.

During the last six months of life the days spent in hospital averaged 11.7 per decedent, and the state average varied between 7.3 days in Utah to a high of 16.4 days in Hawaii. An argument is made that a patient in Washington State, for example, where the average hospital stay is 8.5 days per last six months, may actually have better health outcomes than a patient in New York State, where the average hospital stay was almost double, at 16.3 days per decedent. Those living in high rate regions had higher mortality rates for chronic conditions including colon cancer and heart attack patients.

Similar variances were observed in days spent in the ICU in the last six months of life. The U.S. average was 3.2, with states varying between under two days in North Dakota, Oregon, Vermont, and Maine, whereas California, Florida, and New Jersey averaged over 4.5 days. Nationally, 20 percent of deaths were associated with a stay in intensive care. However, in some states the “high tech” deaths associated with ICU stays were less likely to occur. These states were clustered in Northern New England, the Upper Midwest, and the Pacific Northwest. Many of these states also had a higher ratio of primary care to medical specialist visits. States which rely more on primary care physicians were more likely to have lower Medicare spending, lower utilization rates and fewer deaths involving the ICU.

The Dartmouth Atlas researchers found academic medical centers differed remarkably in the number of ICU beds used in treating chronic illness in the last two years of life. This is both in comparison to community hospitals and among academic medical centers. The report suggested that care for older patients with chronic disease was best performed by primary care physicians rather than specialty physicians in acute care systems.

A study of academic medical centers belonging to the University of California system (Wennberg, Fisher, Baker, Sharp & Bronner, 2005) suggested people who live in areas with fewer doctors and hospital beds per capita live as long as people where the supply of resources is higher than average. Performance in managing chronic illnesses was measured using four dimensions: Medicare spending, recourse inputs, utilization and quality. Findings included an average of $72,000 in Medicare spending per decedent in the last two years of life at UCLA Medical Center, as compared to $57,000 at UCSF Medical Center. Resource inputs and measurements of utilization were a third greater at UCLA, whereas overall quality measures were better at UCSF. In a comparison of benchmarking resources between the two medical centers, UCLA would have used 76 percent fewer ICU beds, and 61 percent fewer medical specialists, using UCSF's care management style. UCLA Medical Center relied much more on medical specialists in managing chronic patients, a ratio of .4 primary care physicians to every medical specialist, as compared to 1.2 primary care physicians to every medical specialist at UCSF.

One study (Angus, Barnato, Linde-Zwirble, Weissfeld, Watson, Rickert & Rubenfeld, 2004)) on the use of intensive care at end-of-life found, with the exception of those over 85 years of age, most older adults were likely to use the ICU during the decedent admission. The authors estimated that because of the aging American population there will need to be a doubling of ICU beds by 2030 if the health system does not address the need for capacity to care for dying patients in other settings.

Older Adults and End-of-Life Care in the United States

Medicare is a primary payer for end-of life-care in the United States, covering more than 60 percent of the total costs of end-of-life care between the years 1992 and 1996 (Hogan, Lynn, Gabel, O'Mara & Wilkinson, 2000). The proportion of Medicare spending attributable to beneficiaries in the last year of life remaining stable for the last quarter century was about 25 percent. Medicare's coverage is primarily designed for curative focused care, with a rider for hospice services once a six month prognosis of death has been confirmed. There is no separate Medicare payment for specific inpatient palliative care services (Buntin & Huskamp, 2002). Although Medicare covers certain types of end-of-life care under hospice services, the payment adjustment system does not measure severity of illness and costs associated with intensive care. Poor compensation creates disincentives for clinicians to treat patients with complex problems or to council terminally ill patients about their options (Buntin & Huskamp, 2002). Adults over 75 had the highest visit rates among adults 18 and over to the emergency department. In 2006, 28.9 percent of adults over 75 visited the emergency department at least one time, while 11.6 percent had two or more emergency department visits (National Center for Health Statistics, 2009).

Older adults are more likely to be affected by multiple medical problems, have a greater risk of adverse drug reactions from the use of multiple medications, and are more likely to require more hospital resources and are more susceptible to iatrogenic diseases (i.e., those diseases and conditions that inadvertently result from medical treatments or procedures). It is difficult to distinguish between treatment and disease complications (Kane, 1997). Comorbidities may occur prior to, with, or subsequent to primary illness and often hasten the likelihood of a negative outcome. Comorbidities are unrelated to the principal diagnosis and are not necessarily concurrent with the primary disease. They differ from complications that are specifically related to the principal diagnosis. Serious, eventually fatal chronic illnesses include cancers, organ system failures, dementia and strokes. Many elderly decedents were diagnosed with their fatal conditions several years before death (Lynn, Blanchard, Campbell, Jayes & Lunney, 2001).

Chronic illness can consist of nonfatal conditions including arthritis and sensory problems, fatal conditions, and general frailty. Death certificates may mislabel actual cause of death as an episodic experience, such as heart failure, when age-related frailty may be the major contributor of death, especially among the oldest old (Gessert, Elliot, & Haller, 2002). Lynn and Adamson (2003) suggest that older adults with multiple chronic conditions are walking at the edge of a cliff, and the cumulative effect of illnesses or frailty are more accurate causes of death than the actual stressor, a cold for example, which pushes the frail older adult over the edge.

Although the health care system is designed to reimburse disease-specific care, many older adults who enter the hospital require assistance with activities of daily living, such as feeding, bathing and toileting, and experience multiple symptoms such as shortness of breath, pain and nausea. According to the Center to Advance Palliative Care (CAPC, 2012, palliative care professionals note that the usual system of care for acute episodes may not be appropriate for end-of-life care. CAPC reports that medical specialists often act as independent consultants and do not coordinate care; rather they treat symptoms as a guide to diagnosis. Physicians approach care as a "puzzle to be solved," based on a list of organ systems and diseases (CAPC, 2012). Although a coordinated care approach would better benefit older adults, a more likely scenario for individuals with life-threatening illness is care from multiple physicians with no coordination of care (Dartmouth Atlas of Healthcare, 2008).

The Emergency Department

Even at a key point of entry to the hospital, older adults have different needs based on their biopsychosocial situation (Moon, Arnauts & Delooz, 2003). Elistlam (1989) outlined specific differences which are important in emergency care for older adults:

- Physiological changes that occur because of aging can present as disorders.
- Patients both under- and over-report symptoms because they wrongly attribute complaints to aging. Physician's also under- and over-diagnose disorders. Some diseases are difficult to diagnose, whereas temporary ailments may be diagnosed as permanent problems.
- Iatrogenic diseases are common among older adults (Budnitz, Shehab, Kegler & Richards, 2007). The pharmacokinetics of the older adult population is different from that of other adults and polypharmacy, which is common among older adults, increases the likelihood of iatrogenic diseases.
- Multipathology masks laboratory results, thus making diagnosis much more difficult.

Moon, Arnauts and Delooz (2003) found patient assessment in the emergency department is difficult and there is a high risk of discontinuity of care because of lack of information. According to one study, a complete evaluation of functional status and social environment is rarely carried out (Hedges, Singal, Rousseau, Sanders, Bernstein, McNamara & Hogan, 1992), which manifests in improper discharge. This study also found that one-fifth of patients did not follow discharge guidelines because they did not understand them.

The Angus et al. study (2004) analyzing use of intensive care used 1999 hospital discharge databases from six large states, representing 22 percent of the total U.S. population. The authors estimated that approximately 540,000 Americans, or one in five U.S. decedents, died in a hospital after initial admission to the ICU. The average length of stay for decedents was 12.9 days and the average costs were $24, 541. Intensive care costs accounted for more than 80 percent of all terminal inpatient costs.

Patterns of aggressive care near the end-of-life may be a marker for lack of access to proper palliative care services (Earle, Neville, Landrum, Souza, Weeks, Block, Grunfeld & Ayanian, 2005). Earle and colleagues (2005) developed a conceptual framework for measuring aggressive care at end-of-life for cancer patients to measure overly aggressive treatment as a quality-of-care issue. Using hospital administration data, the authors established achievable benchmarks of appropriate care used in assessing practice variability. The benchmark performance measures were based on empirical data from the National Cancer Institute’s Surveillance, Epidemiology and End Results (SEER) Medicare database. Performance measures included using chemotherapy within 14 days of death, proportion starting a new chemotherapy regime in the last month of life, types of hospitalization in the last month of life, death in acute care hospital, lack of hospice, and admission to hospice less than three days before death as measurements of aggressive care. Using this conceptual framework, Earle, Landrum, Souza, Neville, Weeks and Ayanian (2008) found use of chemotherapy continued to rise between 1993 and 2000. In spite of an increase in cancer patient referral to hospice during this time period, most of the increases were due to patients who were admitted within three days of death.

Setoguchi, Earle, Glynn, Stedman Polinski, Corcoran and Haas (2008) used the cancer end-of-life quality benchmark measures developed by Earle and colleagues (2005) and included outpatient pharmacy claims to analyze opiate use and a measured chemotherapy overuse based on emergency department visit or hospitalization due to chemotherapy toxicity. Performance measures include proportion of patients who received chemotherapy in the last 14 days of life; number of emergency medicine visits, ICU visits, hospitalizations in the last month of life, death in acute care hospital, and access to hospice. The study used a Medicare claims data set from New Jersey and Pennsylvania from 1994 to 2003, and found opiates were likely underused for pain management in end-of-life cancer care and chemotherapy overuse was associated with probability of death. In this study Setoguchi et al. (2008) compared a retrospective group of decedents with a prospective group, using cancer patients who died within 14 months of the beginning of the study. The authors noted the similarities between the two groups using the benchmark measures which suggested support for using prospective data to assess the quality of palliative care.

Emergency departments routinely do not offer palliative care interventions (Chan, 2006). Approximately 312,000 people died in the emergency department in 2006 (Pitts, Niska, Xu & Burt, 2008). According to the Centers for Disease Control and Prevention, (National Center for Health Statistics, 2009) emergency department visits in U.S. hospitals have increased by nearly 3 million visits per year, from 90.3 million in 1996, to 119.2 million in 2006. In this time period, the number of hospital emergency departments decreased from 4,109 to 3,883. Forty percent of patients 65 or over visiting the emergency department were admitted to the same hospital and those 65 and older were much more likely to be triaged as immediate or emergent (Pitts, Niska, Xu & Burt, 2008).

A survey of emergency department physicians in the New England region (Schumacher, Deimling, Meldon & Woolard, 2005) found that the physicians felt they had inadequate training in geriatric emergency medicine, were less confident in treating, and a had a lack of rapport with older adults. In a study on transitioning from the emergency department, Dunnion and Kelly (2005) found a need for a multidisciplinary approach to decision making when discharging older adults. The study found communication between primary care and emergency department concerning older adults and care planning was problematic. There was a lack of follow-up planning and a multidisciplinary approach to selecting criteria for referral from the emergency department to the primary care sector was needed for better continuity of care. Providing multidisciplinary resources was also associated with fewer return visits to the emergency department (McCusker, Ionescu-Ittu, Ciampi, Vandeboncoeur, Roberge, Larouche, Verdon & Pienault, 2007).

Older African-American and Asian patients are more likely to be admitted to the emergency department and to die in hospital than both white and Hispanic patients

(Smith, Earle & McCarthy, 2009) when controlling for clinical and sociodemographic factors. In an analysis of the SEER Medicare database, the Smith et al. study found that older African-Americans and Asians are more likely to receive high-intensity care at end-of-life. High intensity care was operationally defined as two or more hospitalizations in the last month of life, death in hospital, Intensive Care Unit use in the last month of life, chemotherapy in the last two weeks of life and two or more emergency department visits in the last month of life.

Hospice Care

Hospice care always provides palliative care. However, it is focused on terminally ill patients; people who are no longer seeking curative treatment and who are expected to live for six months or less. Hospice has been considered a major innovator in the provision of palliative care at end-of-life since the Medicare Hospice Benefit was enacted in 1982 (Taylor, Osterman, Van Houtven, Tulsky & Steinhauser, 2007). According to the National Hospice and Palliative Care Organization (NHPCO Facts and Figures: Hospice Care in America, 2008) hospice care is defined as quality, compassionate care for people who are facing a life-limiting illness or injury. “At the center of hospice care is the belief that all people have the right to die pain-free and with dignity, and that their families will receive the necessary support to assist them” (p. 3). The patient and family are at the center of a team oriented approach to medical, psychosocial and spiritual care. The interdisciplinary team usually consists of the patient’s personal physician, hospice physician, nurses, home health aides, social workers, bereavement counselors, spiritual counselors, therapists and volunteers.

The modern hospice movement began in England in 1967, led by Dr. Dame Cicely Saunders, whose main goal was to improve the quality of care for dying patients. The U.S. hospice movement emerged in the early 1970s, with a focus on cancer care for patients. In 1982, Congress approved the Medicare Hospice Benefit (MHB) under the Tax Equity and Fiscal Responsibility Act (TERFRA). A physician must certify that a patient is eligible for Medicare hospital benefits (Medicare part "A" coverage), and is likely to die within 6 months if a terminal disease follows its likely course. The patient must waive Medicare part A and cannot receive treatment or prescription drugs intended to cure the terminal illness. Once the Medicare Hospice Benefit begins, the patient receives care from an interdisciplinary team that includes the primary physician (billed under Medicare part "B"). The patient must be reassessed at two, three month intervals, and then continue to be reassessed at two month intervals to document continued decline and determine appropriate care (NHPCO).

There were approximately 2,400,000 deaths in the U.S, in 2007 (National Vital Statistics Report, 2011). 1,400,000 patients received hospice care, of these 930,000 patients died under hospice care, 258,000 remained in hospice care at the end of 2007, and there were 222,000 live discharges. The NPHCO report provides an annual analysis of patient and provider characteristics and organizational structure of hospice across America. Hospice admissions have increased from 950,000 in 2003 to 1.4 million in 2007, when approximately 38.8 percent of deaths in the U.S. were being served by hospice. The average lengths of stay were 67.4 days and the median lengths of stay were 20 days. The median length of stay is reported more often because it is not as affected by outliers. Many patients died or were discharged within one week of admission (30.8 percent), whereas only 13.1 percent died or were discharged after the initial six-month Medicare benefit.

Although there is a perception among health care providers that hospice care may hasten death, for many hospice patients length of survival increases as compared to non-hospice patients with similar disease trajectories (Connor, Pyenson, Fitch, Spence & Iwasaki, 2007). This study analyzed the surviving Medicare beneficiary population from 1998 to 2002 and found among six indicative markers, congestive heart failure, and five types of cancer, the mean survival was 29 days longer for hospice patients. The study also found that hospice care may increase longevity or at least not hasten death for those who choose hospice compared to those with certain well-defined terminal illnesses.

Among the specific factors that lead to increased survival rate are less likelihood of overtreatment for late stage patients who enter hospice; improved monitoring and symptom treatment; and the benefits of psychosocial support, which have been shown to prolong life (Kroenke, Kubzansky, Schernhammer, Holmes & Kawachi, 2006). The higher level of personal care provided by hospice may increase the patients' desire to continue living. For oncology patients, forgoing aggressive therapies including high-dose chemotherapy or bone marrow transplantations may increase survival time. Symptom treatment under the Medicare hospice benefit allows for medication reimbursement that may not be covered under Part D of the Medicare benefit.

Location of place of death for hospice patients have been moving from patients' place of residence (70 percent in 2007; 66.7% in 2010) to an increase in use of hospice inpatient facilities (21.9 percent in 2010) (NHPCO Facts and Figures: Hospice Care in America, 2012). The location of hospice patients at death also increased for acute care hospitals from under 10% in 2007 to 11.4% in 2010. Hospice care in nursing homes has been steadily increasing with the proportion of nursing home decedents receiving hospice care rising from 14% in 1999 to 33.1% in 2006 (Miller, Lima, Gozalo & Mor, 2010).

Concerning the demographics of hospice use, about 83 percent of hospice patients are over the age of 65, and of these 36.6 percent are over the age of 85. Women are slightly more likely to use hospice than men and white non-Hispanics are more likely to use hospice than African Americans, Hispanic, Asian, Multiracial or other races (Conner, Elwert, Spence & Christakis, 2008). Smith, Coyne, Cassel, Penberthy, Hopson & Hagar, (2003) found when controlling for clinical and sociodemographic factors, Hispanic patients enrolled in hospice at rates similar to white non-Hispanics. The Smith et al. study (2003) also found African-American and Hispanic patients were less like to acknowledge their terminal illness status and were more likely to want their prognosis to be undisclosed among family members. Yet another study found lower hospice enrollment rates among Asian American and Pacific Islander Medicare beneficiaries with advance cancer (Ngo-Metzger, Phillips & McCarthy 2008). These demographics are similar to trends in specialized palliative care service utilization among the U.S. population.

Hospice in the U.S. was originally developed for patients with a well defined prognosis of less than 6 months. Most of the patient populations served by hospice in the early years were diagnosed with malignant cancer. However, the hospice population has been trending from cancer diagnosis (i.e., over 50 percent of primary diagnosis in the

1970s) to chronic diseases in recent years. Non-cancer diagnoses, including heart disease, dementia and chronic obstructive pulmonary disease (COPD), accounted for 64.4% percent of primary diagnosis in 2010 according to the National Hospice and Palliative Care Organization (NHPCO, 2012).

The 2008 NHPCO Statement on Access to Palliative Care in Critical Care Settings suggested hospice care remains underutilized in the U.S. as 90 percent of Americans were unaware hospice care is fully covered by Medicare. Although the percentage of people who die in the U.S. who access hospice has increased from 20 percent in 2000 (Foley & Gelbard, 2001) to 38.8 percent in 2007; of 2.45 million total deaths in the U.S in 2010, 1,029,000 occurred under hospice care (NHPCO, 2012). NHPCO reported that in 2010 35.3% of hospice patients died within seven days of admission. The median utilization has decreased from 22 days in 2000 to 19.7 days in 2011. The Conner, et al. (2008) study suggests demographic factors, misconceptions of eligibility requirements, and patient provider communication are all barriers to improved hospice utilization.

Palliative Care

Palliative care is a type of medical treatment that focuses on the treatment of symptoms as opposed to acute care, which focuses on curative treatments. As defined by the World Health Organization (2004):

> Palliative care is an approach that improves the quality of life of patients and their families facing the problems associated with life-threatening illness, through the preventive and relief of suffering by means of early

> identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual (p.14).

Palliative care is not synonymous with hospice care as it does not require a terminal prognosis of six months or less to access. However, palliative care is usually offered to patients with terminal prognosis for the short term. Palliative care also does not need to prolong or shorten death, instead regarding dying as a normal life process. Palliative care may be applicable earlier in the illness and may be included with life prolonging therapies, including chemotherapy and radiation therapy. By stressing the needs of patients and their families, quality of life is enhanced through the course of illness.

Many older patients are chronically ill and require a simultaneous palliative and life-prolonging care model. The traditional concept of palliative care is that it is offered only after potentially curative treatment has failed, is restricted to a relatively short and recognizable period at end-of-life, and is provided by specialists. However, another concept of palliative care is one that can be offered early in the trajectory of an illness as needs develop (Lynn & Adamson, 2003). A comprehensive “Trajectory” model of palliative care along the trajectory of dying was developed by Lynn and Adamson (2003) and is provided in Figure 3, alongside with the traditional “Transition” model, where the provision of acute care is abruptly discontinued and the Medicare Hospice Benefit is provided. Patients with serious chronic illnesses have complicated needs, and life-prolonging disease focused care does not address the symptom management and support services of palliative care.

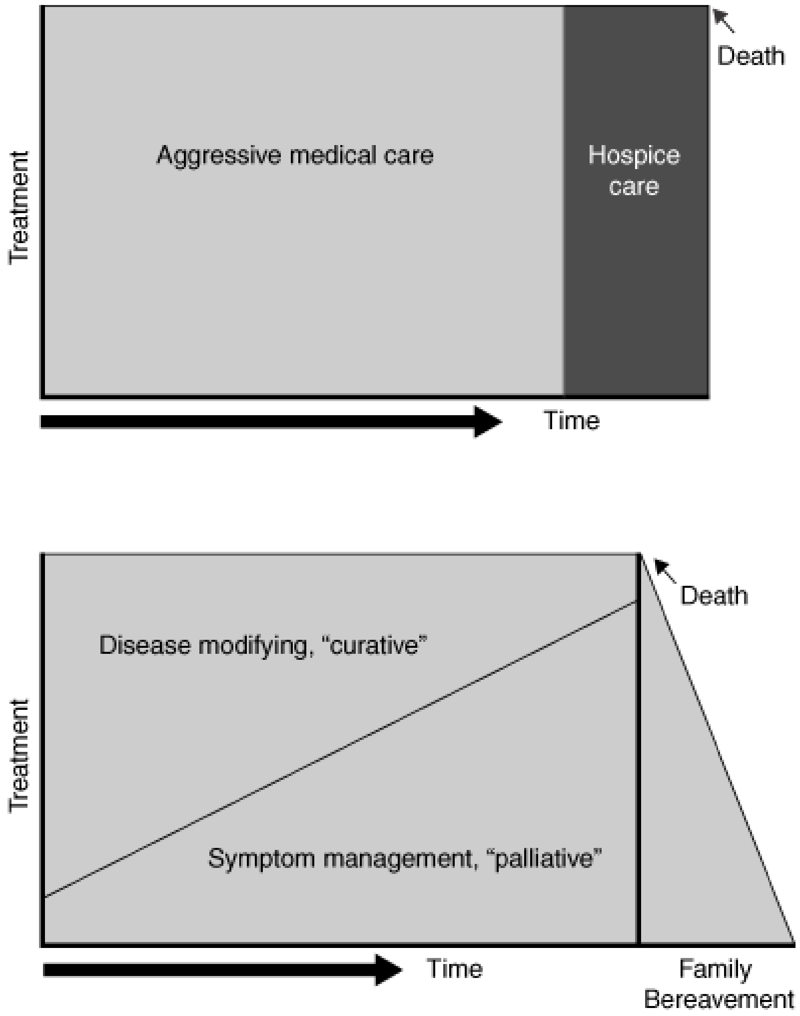


Figure 3. The Older "Transition" Model of Care Versus a "Trajectory" Model Source: Lynn and Adamson, 2003

The traditional concept of palliative care is to only to be administered in the last weeks of life by a specialized service. However, since families experience illnesses throughout the course of a lifespan, symptoms management, psychosocial and spiritual care are appropriate in addition to curative treatment. This concept of palliative care allows for the support of people with multiple chronic problems over a non-defined trajectory of illness. A terminal prognosis is not required to receive palliative care.

Doctors' prognostic estimates of dying patients are usually wrong and often overly optimistic (Christakis & Lamont, 2000). Accurate prognosis of survival time for a terminal patient is crucial in determining entrance into the Palliative Care unit and to receive timely palliative care. Unfortunately, physicians lack the ability to accurately predict the length of survival of terminally ill patients. A terminal illness trajectory of death makes up 22 percent of the dying Medicare population. Of the 2.3 million Americans who died in 1997, roughly 2 million (86 percent) were Medicare beneficiaries (Bird, Shugarman & Lynn, 2002).

Hospital-based specialized palliative care programs have increased steadily since the landmark Study to Understand Prognosis and Preferences for Outcomes and Risks of Treatment (SUPPORT; 1995), concluded that many people suffer needlessly at end-of-life. The American Hospital Association reported that as of 2003, a quarter of all hospitals offered palliative care services (Morrison, Maroney-Galin, Kralovec & Meier, 2005). The prevalence of hospital-based palliative care programs increased from a national average of 24.5 percent in 2000 to 52.8 percent (1294/2452) in 2006 (Goldsmith, Dietrich, Qingling, & Morrison, 2008).

In 2006, Hospice and Palliative Medicine was recognized by the American Board of Medical Specialties as a subspecialty of 10 participating boards. The same year the Accreditation Council for Graduate Medical Education initiated accreditation for Hospice and Palliative Medicine fellowship programs; there has been a nursing hospice certification program since 1994. In 2007, the National Board of Certification for Hospice and Palliative Nurses received accreditation from the American Board of Nursing Specialties. The first certifying examinations for the Hospice and Palliative Medicine Subspecialty were administered in October, 2008.

The University HealthSystem Consortium (UHC), an alliance of U.S. academic medical centers, developed benchmarks to provide guidelines, standards and performance measures for the delivery of palliative care services (Twaddle, Maxwell, Cassel, Liao, Coyne, Usher, Amin & Cuny 2007). The authors identified eleven key performance measures: including 1.pain assessment; 2. use of a quantitative pain rating scale; 3. reduction or relief of pain; 4. bowel regimen ordered in conjunction with opioid administration; 5. dyspnea assessment; 6. reduction or relief of dyspnea; 7. documentation of patient status; 8. psychosocial assessment; 9. patient family meeting; 10. documentation of discharge plan; and 11. discharge planner arranged any home services necessary. The authors defined the patient population that would benefit from palliative care services using diagnosis-related groups (DRGs) with high in-hospital mortality rates. The study was comprised of 1596 patients within 35 UHC institutions. The study found that other than the documentation of pain and dyspnea, few of the institutions achieved benchmarks in any of the other performance measures, and not one of the participating hospitals reached all of the benchmark goals.

The M.D. Andersen Cancer Center, at the University of Texas in Houston, is a leading institution supporting research and publications on innovations in specialized palliative care services. The palliative care program was established in 1999, and initially provided services through a mobile unit and an ambulatory treatment center. The Palliative Care Unit was established in 2002, and the program received the Circle of Life Award in 2004. The Thomas Palliative Care Unit at Virginia Commonwealth University Health System in Richmond, Virginia won the award in 2005, one of three annual recipients out of 1500 applicants that year. The award helped the Unit with both internal and national recognition for quality of care, and allowed for funding a full time chaplain for the unit. The Circle of Life Award is sponsored by the American Hospital Association, the American Association of Homes and Services for the Aging, the American Medical Association, and the National Hospice and Palliative Care Organization. Criteria for the Circle of Life Award include programs that:

- are striving to equitably provide effective, patient-centered, timely, safe, and efficient palliative and end-of-life care
- are striving to implement the preferred practices for palliative and hospice care quality identified by the National Quality Forum consensus report
- show innovation and serve as models for the field
- support hospitals' and health organizations' efforts to improve palliative and end-of-life care
- build awareness of the importance of serving patients near the end-of-life well and supporting those close to them and
- are actively working with other health care organizations and the community across the continuum of care

The palliative care program has had double digit growth since receiving the Circle of Life Award. Staffing now includes ten palliative care physicians, and has expanded its supportive care center outpatient service to include a mobile consulting team, allowing the service to see earlier patient referrals in the disease process and alongside curative care. Research results from the studies conducted at the 12 bed dedicated palliative care unit at the M.D. Andersen Cancer Center may prove useful in an analysis of the impact of the 11 bed dedicated Thomas Palliative Care Unit on providing access to palliative care.

Bruera and colleagues (2003) used death certificate data to analyze factors associated with place of death for cancer patients in the Houston area. Findings supported the Gomes and Higginson (2006, 2008) model on variations of place of death. Between September 1996 and August 1998, 51 percent of cancer patients died in the hospital, 35 percent died at home and 8 percent died in a nursing home, with the remainder unknown. Patients with non-solid tumors had 2.7 times the odds of dying in hospital compared to patients with other cancers. African-American cancer patients were 1.5 times more likely to die in the hospital and male cancer patients were 1.1 times more likely to die in the hospital. Married cancer patients were more likely to die at home. The authors suggested the establishment of specialized palliative care teams within acute care hospitals to provide high quality end-of-life care for these cancer patients.

One six year retrospective study (Elsayem, Smith, Parmley, Palmer, Jenkins, Reddy & Bruera, 2006) at the M.D. Andersen Cancer Center measured specialized palliative care utilization by merging billing files of in-hospital decedents with billing files of patients who utilized palliative care. Access was determined by either a palliative care consultation or primary care by a designated palliative care physician. The primary purpose of this study was to measure the impact of a palliative care program on overall in-hospital mortality and length of stay. The authors found there was no change in overall mortality rate or inpatient length of stay. Deaths in the Intensive Care Unit dropped from 38 percent in 1998 to 28 percent in 2004 ($p < 0.0001$). Although no significant demographic differences were found in patients who died in different locations of the hospital, hematologic disease was found to be a predictor of location of death.

A clinical analysis of patients who utilized specialized palliative care services in one year (starting September 1, 2003; n = 1067 consultations) at the M.D. Andersen Cancer Center found most common cancers were head and neck, gastrointestinal, genitourinary, gynecologic cancers and lymphoma (Dhillon, Kpotez, Pei, Fabbro, Zhand & Bruera, 2008). Symptoms that required palliative care consultation included pain, delirium, dyspnea, fatigue and psychosocial issues. A quarter (24 percent) of the patient population who utilized specialized palliative care services resulted in death, whereas the other three quarters were discharged to home, hospice or other health care sites. Of the 254 deaths, over half (53 percent) died in the palliative care unit, and the remaining deaths occurred in the primary care unit. Dhillon et al. (2008) found patients with a combination of delirium and dyspnea were more likely to die as inpatients. Both symptoms were associated with the likelihood of death but the combination of the two, where patients show sustained cognitive impairment, was a stronger predictor of in-hospital death.

A critical literature review of access to palliative care by older people with dementia by Birch & Draper (2008) suggested an urgent need to improve palliative care utilization for patients with cognitive impairment. Birch and Draper concluded that specialized palliative care services were a necessity for patients with end-stage dementia.

Dhillon et al. (2008) argue that a dedicated palliative care unit is important for the delivery of palliative care because of the high symptom burden, multidisciplinary nature of the interventions and a need for appropriate off hour and weekend staffing.

There are large variations in the amount and cost of care provided by hospitals to older patients with chronic illnesses, even after controlling for illness severity. Skinner and Wennberg (2000) found little correlation between the intensity of care at end-of-life and mortality rates measured by ICU days near the end-of-life. Therefore, the authors suggested that quantity and intensity of care does not necessarily translate into quality of care. The National Cancer Policy Board (1999) defined poor-quality care occurring when services were underutilized, over utilized, or based on provider rather than patient preference.

In one study on the economic impact of inpatient palliative care services and length of stay in a palliative care unit (Ciemins, Blum, Nunley, Lasher & Newman, 2007), the researchers chose to exclude the first two days of inpatient care, because high-cost surgeries may occur in this time frame. Using longitudinal data, and a retrospective matched cohort analysis, the authors found receiving a palliative care consult earlier, in 7 days versus 14 days, reduced length of stay from 24 days per stay to 13 days.

Another factor that is driving improved access to palliative care is that specialized palliative care services reduce overall patient costs. Smith, Coyne, Cassel, Penberthy, Hopson & Hagar (2003) provided a cost analysis of the palliative care unit at Virginia Commonwealth University Health System. This study addressed the costs for care of patients over a six month period in 2000. In a case controlled analysis of 38 palliative care unit decedents with 38 decedents who did not receive palliative care services, total costs were reduced from $2,538 per patient to $1,153. The authors believed a 60 percent reduction was a low estimate because an analysis of palliative care costs included hospital costs incurred prior to admission to the palliative care unit. Another matched case controlled analysis of 160 decedents on ventilators in a Bronx hospital-based palliative care program (O'Mahoney, Blank, Zallman & Selwyn, 2005) with decedents who did not receive palliative care services provided a mean reduction in charges of $2,700 per patient. Savings were based primarily on lower ventilator charges and fewer diagnostic tests. One study (Morrison, Penrod, Cassel, Caust-Ellenbogen, Litke, Spragens, & Mieir, 2008) addressed this issue by analyzing data from eight hospitals that were both geographically and structurally diverse. All of the hospitals had similar palliative care consult teams and used the same cost accounting system. The study found the palliative care consult provided a net savings in total costs per patient who died in hospital at $6,896, and the total cost savings per discharge was $2,642. These cost savings analyses have provided impetus for health care organizations to develop specialized palliative care services.

In 2003, the Veterans Health Administration mandated that all Veterans Administration (VA) Medical Centers provide specialized palliative care services (Veterans Health Administration, 2003). Several studies have been published on palliative care provided at the VA hospitals. Penrod, Deb, Luhrs, Dellenbaugh, Zhu, Hochman, Maciewewski, Granieri & Morrison (2006) concluded in a retrospective, observational cost analysis that acute care costs associated with inpatient palliative consultations were lower and ICU admissions less likely than with a control group. The Penrod (2006) study suggested a palliative care consult lowered ICU admission and overall costs because of improved communication about goals of care between patients, families and care providers, addressing issues such as treatments, resulting in fewer tests, less use of inappropriate technology, and avoidance of the ICU. There was also more likelihood of active care coordination over the course of the illness.

Medical school-affiliated hospitals were more likely (84.5 percent) to have palliative care programs than public (40.9 percent), or for-profit hospitals (20.3 percent) (Goldsmith et al., 2008). Among hospitals designated by Medicare as sole community providers, 28.8 percent reported palliative care programs. Tremendous variation occurred among states, with Mississippi at the lowest rate of 10 percent for hospitals with fifty or more beds and palliative care programs, and on the high end of the spectrum, all of Vermont’s large hospitals offer specialized palliative care services.

Access to Palliative Care

Hospital-based palliative care has the potential to provide high quality care to some of the 90 million Americans who live with serious and life-threatening illnesses (Dartmouth Atlas of Health Care, 2008). According to The Dartmouth report, this number is expected to double over the next twenty-five years. Over 70 percent of Americans who die each year are admitted to a hospital within the last six months of life. However, more than half of the family members of Americans admitted to a hospital with a life-threatening illness report suboptimal care (Teno, Clarridge, Casey, Welch, Wetle, Shield & Mor, 2004). In the Teno and colleagues study which surveyed caregivers of patients at end-of-life, a quarter of these patients received inadequate treatment of pain and over a third receive inadequate emotional support, two pillars of palliative care.

Relatively few studies have analyzed access to palliative care in a United States hospital setting. A study on predictors of access to palliative care services at a comprehensive cancer center (Fadul, Elsayem, Palmer, Zhang, Braiteh & Bruera, 2007) found cancer patients who entered the hospital through the ICU were less likely to utilize palliative care services. Cancer patients with hematologic malignancies had lower rates of palliative care utilization than patients with solid tumors. Other studies, including a retrospective analysis of access to palliative care services from Australia (Hunt, Fazekas, Luck, Priest, & Roder, 2002), found no impact on access to care based on gender, socioeconomic status, or race.

Burge, Lawson, Johnston & Grunfeld (2008) found older adults are less likely to access to palliative care programs in Canada. The authors accounted for factors such as health system factors, where older adults in long-term care settings may have palliative care needs met. Adults 65 and older with cancer were less likely to utilize palliative care programs than those 65 years of age or less. Those 85 and over were much less likely to access palliative care services. Using the Andersen (1996) behavioral model to analyze factors associated with access to palliative care, the authors found that age was a predictor of registering for palliative care services when controlling for the confounding effects of other predisposing, enabling and evaluated need characteristics.

One systematic review of access and referral to palliative care services (Ahmed, Bestall, Ahmedzai, Payne, Clark & Noble, 2004) found that a lack of knowledge among health care providers and lack of standardized referral criteria were barriers to palliative care access. The literature review involved studies published between 1997 and 2003. In this time period there was a rapid growth of hospice and palliative care services, which led to inaccurate perceptions by both service providers and the public. Ahmed et al. (2004) found the unplanned rapid growth of palliative care led to heterogeneity in what palliative care services in different localities offer; lack of understanding among professionals about whom to refer, and when; resistance by some professionals to share with or hand patients over to palliative care services, even when it would be in the patients' interest; reluctance by many patients and family caregivers to be referred for specialized palliative care services, because of misunderstandings of what it offers, or fear of its association with imminent dying; *perception* that palliative care is only for cancer patients; and missed opportunities, both contextually and individually. The authors suggested many patients were doubly disadvantaged because they were both experiencing life threatening illness and did not receive appropriate palliative care services.

An article on barriers to providing palliative care services in a urban public teaching hospital with a culturally diverse population (Ryan, Carter, Lucas & Berger, 2002) found that the most significant barriers were based on the behaviors of the primary physicians. The research was conducted over a 28-month period at the Los Angeles County and University of Southern California Medical Center, after the introduction of a hospital-based palliative care unit. Barrier behavior by physicians included writing orders that did not follow palliative care unit recommendations and did not reflect knowledge about opioid usage. The authors suggested that physicians often dismissed pain and discomfort symptoms as routine. Barrier behaviors by nursing staff centered on misconceptions about pain management sand improper medication administration.

Ryan and colleagues (2002) found patient-centered barriers to proper palliative care services included declining oral medications, refusal to take medications in proper dosages and early self-discharge. For patients who were discharged without an informal caregiver in place, instances of medication mismanagement and renewed symptoms often led to readmission. Institutional barriers included a restricted formulary, limited access to appropriate palliative care technologies and the lack of a method to inform the palliative care unit of patient readmissions. In the case of patient readmission, primary physicians tended to not alert the palliative care unit.

Access and the Behavioral Model of Health Services

Patterns of utilization differ from measurements of need or demand for services. In order to better understand patterns of need a theoretical underpinning is required. Andersen (1968) initially proposed that the use of health services is a function of the predisposition to use services, factors that enable use and the need for care in the Behavioral Model of Health Services. Measuring access to palliative care using this model should make the interpretation of utilization data more clear and facilitate understanding of how and why these patterns exist.

The original Behavioral Model (Andersen, 1968) was designed to define and measure equitable access to health care and had an individual level focus. In the initial model, predisposing characteristics, enabling resources and evaluated need were determinants of the use of health services and focused on the family as the unit of analysis. The Aday and Andersen (1974) variation was the first variation of this model to be used to explain access. In the Aday and Andersen variation, access is a function of the need for health care, enabling factors such as income and insurance and predisposing factors such as preferences and expectations. In the expanded Aday and Andersen model where access is an objective measure of health services utilization, access indicators, such as type, site, place of care, purpose and time interval, are predictors of how much care is sought and includes site as a modifying dimension of utilization. Aday continued with this model, using health services research as a model for assessing quality of health care (Aday, Begley, Lairson & Balkrishnan, 2004). In this model, health status is an outcome. The 1995 Behavioral Model of Health Services Use (Andersen, 1995; Figure 4) is the most widely cited variation of the behavioral models (Goldsmith, 2002), and will be used as the framework to understand access to palliative care.

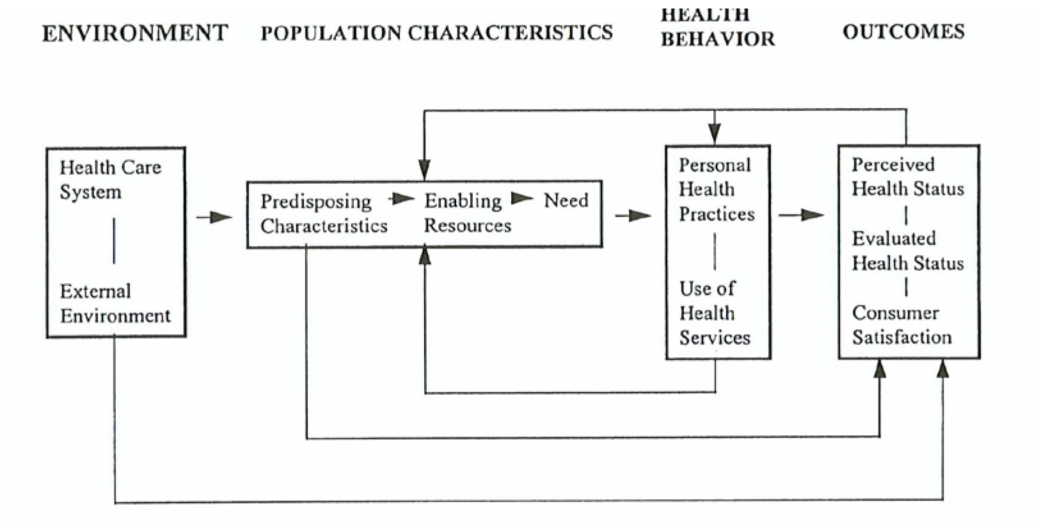


Figure 4. The Andersen Behavioral Model (1995)

Andersen revisited the Behavioral Model (1995) and included the influences on health services’ use and feedback loops, which show that outcomes affect subsequent predisposing factors and perceived need. The Andersen and Davidson Model (2007) expanded the external environment to include community characteristics. The model emphasizes the importance of community and the structure and process of providing care. The external environment; for example the availability of a hospital-based Palliative Care Unit, an enabling condition that facilitates the use of palliative care services, becomes more prominent in this variation. This model provides for contextual enabling resources including ones having health insurance and not being in poverty as increasing the odds of access to care.

The conceptual model (Figure 5) measuring potential determinants of access to a palliative care program, uses the Andersen and Davidson (2007) variation of the Andersen (1995) model, which includes individual levels for both environment, the availability of a palliative care consult or admission to palliative care unit, and enabling resources, Medicare recipient or private insurance, versus no insurance. In this model the environment, where the entire population of decedents have potential access to palliative care, in part, determined by population characteristics, and in part, by health behavior determined by a modifying variable, admitting attending physicians grouped by medicine, surgery and emergency medicine. The population characteristics can then be used as predictors of service utilization.

Large Urban Public Teaching Hospital	**Predisposing Characteristics**	**Enabling Resources**	**Evaluated Need**	**DV**
Patient Admission	Age Gender Ethnicity Marital Status	Insurance/ No Insurance	Hematologic Cancer/ Solid Cancer/ No Cancer Oncologist/ Other	Palliative Care Consult
Patient Admission	Age Gender Ethnicity Marital Status	Insurance/ No Insurance	Hematologic Cancer/ Solid Cancer/ No Cancer Oncologist/ Other	Admission to Palliative Care Unit

Figure 5. Potential Determinants of Access to a Palliative Care Program

A literature review of forty-eight studies on patterns of access to palliative care, conducted between 1998 and early 2008 (Walshe, Todd, Caress & Chew-Graham, 2009), described factors that affecting access to community palliative care services. The characteristics of those who are less likely to use palliative care services included being in the later stages of old age, male, an ethnic minority, not married, with no informal caregiver, low income and not having cancer. This pattern of utilization was markedly similar to other systematic reviews of palliative care utilization (Ahmed et. al, 2004, Burt & Raine, 2006). The authors grouped the patterns of access into three distinct areas: demographic, social and medical characteristics. These areas correspond to Andersen's

Behavioral Model (1995), where the predisposing characteristics included age, gender, ethnicity and marital status, enabling resources included socioeconomic and informal caregiver factors, and evaluated need included diagnosis and functional status.

Characteristics of Care-Seeking Behavior

There are relatively few studies on transitions of care and how and whether people receive appropriate care (Ricketts & Goldsmith 2005). Although many studies have measured differential use of palliative care, few have hypothesized reasons for such differences (Walshe et al., 2009). Only a proportion of the patients with life-limiting illnesses who would benefit from the services offered by a hospital-based palliative care unit are referred to the unit. Difficulties in defining a target population are inherent in palliative care research (Currow, Wheeler, Glare, Kaasa & Abernethy, 2009). One avenue to improve access to palliative care is to better understand why some people who are at the end-of-life and require hospitalization are admitted to a Palliative Care Unit, whereas others in the same situation die in the hospital with little or no palliative care services. Another aspect is to better understand whether equitable palliative care access is provided. This study describes the effect of individual and community characteristics on whether adults with similar disease trajectories, who differ by predisposing, enabling and evaluated need characteristics, receive hospital-based specialized palliative care services when it is the appropriate level of care. This study also proposes and applies a comprehensive integrated framework to categorize and assess the importance of individual-level variables that enable access to people who would better benefit from palliative care services.

Research Objectives and Hypothesis

The objective of this study is to investigate the extent of referrals to and use of palliative care at a large urban teaching hospital and to document the roles that predisposing, enabling, and evaluated need characteristics play in a palliative care consult and the admission to the palliative care unit.

The first research objective seeks to describe who does and who doesn't utilize palliative care in a large urban teaching hospital. The second research objective seeks to understand predictors of decedents who utilize a palliative care consult at a large urban teaching hospital. Both research objectives seek to understand predictors of decedents who receive a palliative care consult or are admitted to a palliative care unit at a large urban teaching hospital. Better understanding the factors associated with accessing palliative care may facilitate more appropriate use of a formal hospital-based palliative care program.

Predisposing Characteristics

Age

Advanced age has been shown as a factor associated with frailty and the kinds of conditions leading to the need for palliative care. Burge, Lawson, Johnson, and Grunfeld (2008) found age inequalities exist in palliative care access. Their findings support individuals 85 plus with cancer are much less likely to receive palliative care services than those less than 65 years of age. As the United States ages, the percentage of the population over 65 increases, and the population over 85 increases, the types of diseases which affect this population become more commonplace. More people die as a result of serious chronic diseases, respiratory diseases, and cancer. The effects of the compression of morbidity, which suggests that age-related morbidity can be reduced and postponed as older adults adapt with healthier lifestyles (Jagger, Matthews, Matthews, Robinson, Robine & Brayne 2007; Hubert, Bloch, Oehlert & Fries, 2002), may be offset by an increase in longevity where the population living with chronic disease increases.

In a study assessing differences in palliative care needs for the oldest old from those of younger patients, Evers, Meier and Morrison (2002) found that patients over 80 were less likely to have cancer as the primary disease at palliative care consult. Those over 80 were more likely to be white women, living in long-term-care. They had a higher prevalence of dementia, incapacity, and were more likely to suffer from chronic conditions of uncertain prognosis. Decision incapacity concerning goals of care was more prevalent due to the high prevalence of dementia. The study found a greater reliance on proxy decision making by physicians as surrogate decision-makers. Treatment differences included that those over 80 were less likely to receive life-prolonging care and were more likely to be discharged to a nursing home.

The Walshe et al. (2009) literature review found that the median age for those receiving specialized palliative care services was in the early old age, between 65 and 74 years of age. While the authors found that the oldest old are less likely to be referred to palliative care services, Burt and Raine (2006) suggested this may in part be due to vertical equity (Moon & Jan, 1997) where the needs at end-of-life for the oldest population may differ enough from the younger old that palliative care may not be appropriate. Another study (Gagnon, Mayo, Hanley & MacDonald, 2004) found age is a determinant of access to palliative care services, with older women with breast cancer much more likely to utilize palliative care than younger and middle aged women.

The Walshe et al. (2009) review found no consistent trend on age as a determinant of access to palliative care, in part due the different settings of palliative care services that were offered. Most studies indicated younger patients were more likely to be referred to palliative care. The authors suggested there may be a systematic bias as the oldest survive for less time after a serious diagnosis. However, the authors concluded older adults are less likely to access services, but the reasons why remain unclear. The first hypothesis ($H_{1)}$ is: older decedents are less likely to receive a palliative care consult.

Gender

Differences in gender morbidity contribute to differences in men's and women's health care utilization at end-of-life, because women are more likely than men to suffer from chronic illnesses (Bird, Shugarman, & Lynn, 2002). Women are more frequent users of health care (Verbrugge, & Steiner, 1981), and receive less aggressive health care (American Medical Association, 1991). The majority of studies that have reported a gender difference in access to palliative care concluded women were more likely to be referred to palliative care than men (Burge, Lawson, Critchley & Maxwell, 2005); (Solloway, LaFrance, Bakitas & Gerken, 2005) while other studies have reported only gender variations with men over 65 less likely to be referred (Burge et al., 2008) and no gender variation in access to palliative care (Constantini, Higginson, Boni, Garrone, Henriquet & Bruzzi, 2003; Potter Hami, Bryan & Quigley, 2003). Walshe and colleagues (2009) suggest informal caregiver gender may have as much impact as patient gender.

The second hypothesis (H_2) is: Women decedents are more likely to have received a palliative care consult.

Marital Status

Marital status, which also serves as an informal caregiver proxy, has shown to have a positive effect on palliative care referral (Solloway, LaFrance, Bakitas & Gerkin, 2005). Not one of the forty-eight studies in the Walshe and colleagues (2009) review showed being married had a negative effect on palliative care referral. In a study using the 1993 National Mortality Follow-Back Survey, Wacherman and Sommers (2006) found marital status was the key mediator of gender differences in end-of-life care. Specifically, persons with an informal caregiver were more likely to die at home or in a hospital, while those without a spouse were more likely to die in a nursing home.

Watcherman and Summers (2006) found marital status was the key predictor of home versus institutional care in the last year of life. The availability of an informal caregiver allowed the individual to die at home. The study also found Medicaid was a more important safety net for women than for men and men were less likely to receive informal care because of their desire to seek community-based services in deference to informal caregivers (Laditka, Pappas Rogich & Laditka, 2001). Taken together with the findings that men with chronic illness are more suspicious of the health care system (Perkens, Cortez & Hazuda, 2004), the authors suggested clinicians should be aware male patients are less likely to receive adequate care at home in the last year of life. The third hypothesis i(H_3) is: Married decedents are more likely to have received a palliative care consult.

Ethnicity

Ethnic minorities' under-use palliative care even when they have access to this care (Crawley, Payne, Bolden, Payne, Washington & Williams, 2000). Minority Americans are more than 1.5 times as likely to die in a hospital as White non-Hispanic Americans, even when partially controlling for insurance and insurance status (Hansen, Tolle & Martin, 2002). These same patients are less likely to prepare a living will (Hanson & Rodgman, 1996) and more likely to request life-sustaining treatments if they have a terminal illness (Blackhall, Murphy, Frank, Michel & Azen, 1995). Both the avoidance of communicating that death as is a potential outcome and a general mistrust of the health care system in the African American community contributes to a misunderstanding of the goals of end-of-life care (Crawley, 1999).

Pain and suffering for some ethnic groups are to be endured as part of a spiritual commitment rather than to be avoided (Kumasaka, & Miles, 1996). Similarly, traditional Islamic teachings hold that pain, sent by God to test one's faith, must be endured (Al-Jeilani, 1987). African American spiritual practices reflect a view of death as a "welcome friend" and those who have died have "gone home" (Crawley et al., 2000). Many Hispanics also view pain and suffering as a test of faith. There is an acceptance of "what is" and a belief that "miracles happen" (Peralta, 2002). This view can interfere with palliative care.

In a systematic review of access and referral to palliative care services, Ahmed and colleagues (2004) found minority ethnic communities, older adults, people who were socially excluded and patients with nonmalignant conditions were less likely to receive referrals to palliative care. A Canadian study (Burge, Lawson, Johnston & Grunfeld, 2008) found similar access patterns between the black community and the overall population. The authors suggested longer established minority communities may mirror the overall Canadian population in regard to access to palliative care, while more recent established immigrant communities have cultural and language differences, which were factors limiting access to palliative care.

A study on racial and ethnic differences in preferences for end-of-life treatment (Barnato, Anthony, Skinner, Gallagher, & Fisher, 2009), found the majority of Medicare beneficiaries prefer home death and avoidance of life-prolonging drugs with uncomfortable side effects or mechanical ventilation. The study surveyed 2,847 community-dwelling Medicare beneficiaries aged 65 or older, by phone and mail, and found minority elders, both African-American and Hispanic, were more likely to prefer intensive treatments at end-of-life than non-Hispanic Whites. African Americans were more likely to prefer life-prolonging drugs, and mechanical ventilation. African-Americans and those with poorer health were more worried about receiving too much medical treatment in their last year of life. Conversely, Non-Hispanic whites were more likely to prefer potentially life-shortening palliative drugs and to spend the last days of life at home. Also, having a painful condition was associated with preference for potentially life-shortening palliative drugs. One study comparing hospice use among urban African American and White non-Hispanic nursing home decedents (Lepore, Miller & Gozalo, 2011) found that African Americas are less likely to use hospice services. The study suggests increasing the use of advance directives and targeting

African Americans with congestive heart failure could be effective strategies to address barriers to hospice access.

In an article on barriers to access to hospice and palliative care in the African-American community (Winston, Leshner, Kramer & Allen, 2005), the authors found underutilization could be attributed to spiritual and cultural barriers, distrust and skepticism of healthcare services, the influence of physicians with little or no palliative care training, and financial disincentives. The authors stressed the development of trusting relationships in order to eliminate access barriers to palliative care.

Another study on racial differences in the use of advance directives (Johnson, Kuchibhatla & Tolsky, 2008) used a combination of sociocultural variables including the Health Care System Distrust Scale (Rose, Peters, Shea & Armstrong, 2004) to explain that beliefs and values explained a greater preference for life sustaining therapies, less comfort with discussing death, greater distrust of the healthcare system and conflicting spiritual beliefs with the goals of hospice. Given the exploitation of African Americans by the American health care system and their beliefs, and continued prejudice in the system, African Americans would be less likely to utilize palliative care. The fourth hypothesis (H_4) is: African American decedents are less likely to receive a palliative care consult.

Enabling Resources

Insurance

Variables that increase the possibility of having informal caregiving, such as marriage status and living with family members, are a positive determinant of access to palliative care. Studies looking at informal caregiving as a determinant of, and measuring referral rate to home-based palliative care services (Chen, Haley, Robinson & Schonwetter, 2003; Greiner, Perera & Ahluwalia, 2003; Miller, Kinzbrunner, Pettit & Williams, 2003; Peters & Sellick, 2006) have found living alone decreased the likelihood of referral to palliative care. Age and gender of informal caregiver may also have been a determinant of access, where patients with female caregivers who were a generation younger were more likely to receive palliative care services (Grande, Farquhar, Barclay & Todd, 2006).

Socioeconomic factors including regional differences influenced how and where people die. Wealthy regions can afford more hospitals with more hospital bed availability. The availability of hospital beds was strongly associated with the hospital as a location of death (Hansen, Tolle, & Martin, 2002). The regional availability of hospital beds, hospice beds, and a higher proportion of generalists influences hospice enrollment (Christakis & Iwashyna, 2000).

Studies that have measured socioeconomic factors as determinants of access to palliative care include characteristics such as education, home ownership, income and health insurance. Trends found in recent studies on access to palliative care suggest those who have fewer socioeconomic disadvantages are more likely to utilize palliative services (Walshe et al., 2009). Studies measuring education have been inconclusive. Some have found greater education levels are predictors of access to palliative care (Greiner Perera & Ahluwalia, 2003; Becarro, Constantini, Franco Merlo & the ISDOC Study Group, 2007). While other studies (Chen, Haley, Robinson & Schonwetter, 2003;

Constantini Higgenson, Boni, Orengo, Garrone, Henruquet & Bruzzi, 2003; Casarett & Abrahm, 2001) have found that lower educational levels are predictors of access to palliative care. Studies measuring income (Casarett & Abrahm, 2001; Greiner et al., 2003; Burge et al., 2008) have found that greater income levels are predictors of access to palliative care. Welch, Teno and Mor (2005) found that Medicare enrollment when controlling for age is a predictor of access to palliative care, while other studies have measured lack of insurance as a predictor of access to palliative care (Casarett & Abrahm, 2001; Peters & Sellick, 2006). The fifth hypothesis (H_5) is: Decedents who have no form of insurance are less likely to receive a palliative care consult.

Evaluated Need

Cancer

Most studies measuring access to palliative care use cancer as the primary diagnosis (Walshe et al., 2009). Many of these studies found the primary diagnosis was not a predictor of palliative care use (Constantini, et al., 2003; Potter et al., 2003; Solloway et al., 2005). Of the studies that measured types of cancer as a predictor of access to palliative care, hematological malignancies have been shown to be a negative predictor of access to palliative care (Becarro et al., 2007; Fadul et al., 2007; Hunt et al., 2002). The unique biology of hematological malignancies, where care may be high-tech and invasive in nature, has been seen as an obstacle to the access of palliative care. Other cancers provide little direction as predictors of access to palliative care (Walshe et al., 2009). One study found patients with psychiatric history, substance abuse history and dementia history were associated with longer survival after enrolling in the Medicare hospice program (Christakis & Iwashyna, 2000). Both Birch & Draper (2008) and Dhillon et al. (2008) suggest that patients with end-stage dementia require special palliative care services. The sixth hypothesis (H_6) is: Patients with hematological malignancies are less likely to receive a palliative care consult.

Oncologists

Many physician barriers to prognostic disclosure have been identified, including fear of inaccurate estimates (Gordon & Daugherty, 2003; Lamont & Christakis, 2001), oncologists concerns about maintaining hope in prognostic conversations (Gordon & Daugherty, 2003), and patient death being viewed as a personal failure (Friedrichsen & Milberg, 2006). One study suggested that it is difficult for oncologists to discuss transitions in care from cancer treatment -directed to palliative care (Baile, Lenzi, Parker, Buckman & Cohen, 2002). However, one study of California hospitals which offer palliative care services (Pantilat, Kerr, Billings, Bruno & O'Riordan, 2012) cancer patients are more likely to receive palliative care consults (38%) than patients with other diagnoses including pulmonary (18%), cardiac (16%) and neurological conditions (11%). The American Society of Clinical Oncology and the National Comprehensive Cancer Network (NCCN, 2008) recommend guidelines for cancer patients to have access to palliative care at the time of diagnosis and reassessed throughout illness. The palliative care team at VCU Health Systems is located within the Division of Hematology Oncology and Palliative Care, where the diffusion of palliative care has been ongoing since the inception of the palliative care unit. The seventh hypothesis (H_7) is: Oncologists are more likely to refer decedents for a palliative care consult.

Admission Hypotheses

The second research objective will seek to understand predictors of decedents who are admitted to a formal hospital-based palliative care program within a large urban public teaching hospital. The staff of the Thomas Palliative Care Unit has used the palliative care unit for both consultative and palliative care team patients. However, this objective specifies patients who are admitted to the palliative care unit.

H_8 Older decedents are less likely to be admitted to the palliative care unit.

H_9 Women decedents are more likely to be admitted to the palliative care unit.

H_{10} Married decedents are more likely to be admitted to the palliative care unit.

H_{11} African American decedents are less likely be admitted to the palliative care unit.

H_{12} Decedents who have no form of insurance are less likely to be admitted to the palliative care unit.

H_{13} Patients with hematological malignancies are less likely to be admitted to the palliative care unit.

H_{14} Oncologists are more likely to admit decedents the palliative care unit.

CHAPTER 3 - METHODOLOGY

Introduction

Despite the rapid growth of hospital-based palliative care programs in the last decade, little is known about the patient population who at end-of-life require hospitalization. The purpose of this research was to conduct an analysis of factors that are associated with accessing palliative care by patients who died (decedents) at the Virginia Commonwealth University Medical Center's hospitals and either received a palliative care consult, or were admitted the Thomas Palliative Care Unit. The chapter begins with a statement of the research objectives and the hypotheses tested and an overview of the underlying conceptual models. The model overview and variable description are discussed. This is followed by the data collection procedures, data analysis and limitations of the analytic strategy.

Research Objectives

Objective 1: Analysis of Decedents who received a Palliative Care Consult at VCU Medical Center.

The first objective was to conduct a descriptive analysis of patients that died (decedents) at the VCU Medical Center and who received a palliative care consult. This was followed by an analysis of factors that predict who utilized palliative care services, by consult, and the reasons for doing so. The final analysis was a classification analysis to identify independent variables that best distinguish decedents who received palliative care consults.

Hypotheses tested include:

H_1 Older decedents are less likely to receive a palliative care consult.

H_2 Women decedents are more likely to receive a palliative care consult.

H_3 Married decedents are more likely to receive a palliative care consult.

H_4 Minority decedents are less likely to receive a palliative care consult.

H_5 Decedents with no health insurance are less likely to receive a palliative care consult.

H_6 Patients with hematological malignancies are less likely to receive a palliative care consult.

H_7 Oncologists are more likely to refer patients for a palliative care consult.

Objective 2: Analysis of Decedents who have been admitted to the Palliative Care Unit at the VCU Medical Center.

The second objective was to conduct a descriptive analysis of decedents who have been admitted to the Thomas Palliative Care Unit. This was followed by an analysis of factors that predict who were admitted to the palliative care unit, and the reasons for doing so. The final analysis was a classification analysis to identify independent variables that best distinguish decedents who were admitted to the palliative care unit.

Hypotheses tested include:

H_8 Older decedents are less likely to be admitted to the palliative care unit.

H_9Women decedents are more likely to be admitted to the palliative care unit.

H_{10} Married decedents are more likely to be admitted to the palliative care unit.

H_{11} Minority decedents are less likely to be admitted to the palliative care unit.

H_{12}Decedents who have no form of insurance are less likely to be admitted to the palliative care unit.

H_{13} Patients with hematological malignancies are less likely to be admitted to the palliative care unit.

H_{14} Oncologists are more likely to admit patients to the palliative care unit.

Model Overview

Using Andersen and Davidson's (2007) conceptual version of the Behavioral Model of Healthcare, this exploratory, non-experimental retrospective analysis of secondary data (i.e., medical claims) examined independent variables that were identified in the literature as potential factors that affect accessing palliative care. Whereas previous studies have focused on cancer patients at admission, the available claims data allows for patient-centered longitudinal analysis and the use of a multilevel hierarchical model to measure the interplay of many factors.

The two dependent variables, palliative care consult, and admission to the palliative care unit were tested using logistic regression analysis and the independent variables in both equations were grouped into three population characteristics associated with access and based on Andersen and Davidson's (2007) Model. Predisposing characteristics were measured using decedent demographics including age, gender, marital status and ethnicity. Enabling resources were measured by whether decedent had insurance, and through stratified age groups. Evaluated need characteristics were measured by type of illness at end-of-life, for example, the presence or absence of hematological malignancies, in order to dichotomize the variable. A modifying variable for palliative care consult includes decedent referral by Medicine and Surgery versus Emergency Medicine admitting attending physician and referral to admission to the palliative care unit by Medicine and Surgery versus Emergency Medicine admitting attending physician. Exploratory variables include length of stay in the palliative care unit and length of stay in the intensive care unit.

Dependent Variables

The first dependent variable is a “Palliative Care CNS Consult” entered into the VCU Medical Center’s Cerner computer system. The Palliative Care Team, which is led by either an attending physician certified in palliative care, a palliative care fellow or an advance practice nurse, uses a multi-disciplinary approach to provide advice on the best ways to address symptoms and provide suggestions about appropriate interventions and help clarify the goals of care. The service also helps patients and family members with issues regarding life-limiting disease. This data has been collected since 2005 and consists of approximately 2000 consults.

The second dependent variable is decedents who are admitted to The Thomas Palliative Care Unit at the VCU Medical Center, a high volume, standardized care, 11 bed unit, outpatient clinic and consultation service, which has averaged 450 admits per year since 2001. It is one of six national Palliative Care Leadership Centers in the Nation, and received the 2005 Circle of Life Award from the American Hospital Association. It has been operating since May 1, 2000, and conducts approximately 1000 nursing and medical consultations each year. Patient referrals come from the entire hospital. The patient population chosen for this exploratory, non-experimental retrospective analysis is the approximately 8300 decedents at the VCU Medical Center, between January 1, 1999, and December April 2011. The data set of decedents excludes juvenile deaths, those under 18 years of age, and trauma deaths.

Independent Variables

Variables in the claims data set include: age, gender, marital status, ethnicity, payment source, length of stay, days in the ICU, days in other Units, days in the PCU, place of registration, unit of admission to, unit of death in, diagnosis (DX) code for admission, DX code for death, diagnosis related group (DRG) for admission, DRG for death, and the last unit for decedents.

Independent variables (Table 1.) are grouped into predisposing characteristics, enabling resources and evaluated need based on Andersen and Davidson's version of the Behavioral Model of Healthcare (2001). Additionally, the modifying variable was dichotomized based on types of physician divisions, including Medicine, Surgery and Emergency Room admitting attending physicians. Exploratory variables which could be dichotomized were included in the initial analysis, including days in the PCU and days in the ICU.

Predisposing Characteristics

Most palliative care studies in which age is a variable of interest focus on older frail adults (Burge et al., 2008; Evers, Meier and Morrison, 2002; Gagnon et al., 2004; Walshe et al., 2009). Although Walshe and colleagues suggested that age may not be a determinant due to differences in care settings, this study controls for the care setting.

Most studies find that that the oldest old are less likely to be referred to palliative care. Most studies that look at gender suggest that women are more likely to utilize palliative care services than men (Burge, Lawson, Critchley & Maxwell, 2005; Solloway et al., 2005; Wachterman & Sommers, 2006; Walshe et al., 2009). Research on ethnicity as a factor in accessing palliative care suggests that minorities are more likely to request life-sustaining treatments (Blackhall et al., 1995) and less likely to use specialized palliative care services (Ahmed et al., 2004; Burge et al., 2008; Barnato et. al, 2009). Based on this body of research, the proposed research will examine the predisposing variables of age, gender, marital status and ethnicity as independent variables (Table 1).

Enabling Resources

Studies that measured socioeconomic factors as determinants of access to palliative care include payee information. Those with fewer socioeconomic disadvantages (Walshe et al., 2009) and who are enrolled in Medicare (Welch, Teno & Mor, 2005) are more likely to utilize specialized palliative care services. However, lack of insurance has also been shown to be a predictor of access to palliative care (Casarett & Abrahm, 2001; Peters & Sellick, 2006). For these reasons, whether decedents had medical insurance is included as an independent variable.

Evaluated Need Characteristics

Diagnosis-related groups (DRGs) have been used to identify in-hospital patient populations who are palliative care appropriate (Twaddle et al., 2007). Additional research has identified cancer diagnosis, specifically hematological malignancies, as a

Table 1. Description of Variables

Predisposing Characteristics	**How Measured**
Age	(55-64, 65-84, 85+); (65-84, 85+)
Sex	Male / Female
Ethnicity	African American & Others (Minorities) / White – non Hispanic
Marital Status	Married / Not Married
Enabling Resources	**How Measured**
Personal/Family Resources	Insured / Not Insured
Evaluated Need	**How Measured**
Cancer vs. No Cancer	Hematologic vs. Solid, vs. No Cancer
Referral 1. Discipline of Attending Admitting Physician	Oncologist vs. Other Attending Admitting Physician
Modifying Variables	**How Measured**
Referral 2. Discipline of Attending Admitting Physician	Surgery vs. Medicine vs. Emergency Medicine Attending Admitting Physician
Exploratory Variables	**How Measured**
Length of Stay PCU Length of Stay ICU	Days in PCU Days in ICU

predictor of access to palliative care (Walshe et al., 2009; Constantini, et al., 2003; Potter et al., 2003; Solloway et al., 2005 al. 2007; Hunt et al., 2002). Based on these investigations, hematologic cancer and oncologist as attending admitting physician are included as independent variables.

Modifying Variables

For the palliative care consult and admission to palliative care unit, admitting attending physician will be categorized into three physician groups, Medicine, Surgery, Emergency Room physicians.

Exploratory Variables

Length of stay in other units prior to referral to palliative care has been determined to be a quality indicator of access to palliative care (Twaddle et al., 2007). Potential modifying variables include length of stay for both decedents who receive a palliative care consult and for decedents admitted to the palliative care unit. Length of stay has been shown to decrease for decedents who receive a palliative care consult (Ciemins, Blum, Nunley, Lasher & Newman, 2007). One systemic review of palliative care interventions reducing hospital length of stay, Cassel (et al., 2010) found that ICU based quasi experiments showed a reduction in ICU days. The median length of stay for all decedents at the VCU Medical Center, including ICU days, which controls for outliers, will be used to dichotomize these variables.

Data Collection Procedures

Data for independent variables was collected from the Massey Cancer Center Information Systems (MCCIS) claims database, a locally maintained relational database that is populated by extracting and restructuring information from the Decision Support System (DS). DS is populated with data from several hospital-based systems, updated daily, and contains patient demographics, orders and admission/discharge/transfer information along with additional patient visit and discharge information. A separate billing system (PARS) is interfaced with the claims database and provides billing information for hospital and clinical services. These billing files contain demographic, diagnosis, procedure and charge codes.

Data Analysis

This was a retrospective study of claims data from one institution. Descriptive statistics for the data and various independent variables serving as indicators of potential access were presented. The first step in the analysis was to screen for missing data using SPSS Missing Value Analysis, which analyzed the data to find a pattern of missing data (Morusis, 2012). The missing data was found to be random and nonsignificant except for the marital status variable, where the missing data for the base data set (N = 9,067) was 9.3% (n = 843) of the total population. The continuous variables, Length of Stay in PCU and ICU were then assessed for multicollinearity and outliers. Multicollinearity is detected by examining the standard errors for the *b* coefficients. A standard error larger than 2.0 indicates numerical problems, such as multicollinearity among the independent variables. Boxplots were reviewed and a strategy was developed to address outliers. The continuous variables were weighted to address missing data, and determined to need both square root and logarithm transformation. After transformation, multicollinearity was found in both length of stay in PCU and ICU. Length of stay in PCU was less likely have multicollinearity issues and was added to the binary logistic regression model. When length of stay in PCU was included in the regression analysis, the predicted value in the classification table increased to 98.7%, and the Nagelkerke R_2 increased to a 98.1% predictive value. The resulting multicollinearity values also indicated a problem (*SE* = 6,046.96; *b* = 4,209.06). Therefore it was deemed that these variables would be excluded from the binary logistic regression analyses.

A chi-square test for independence was performed to explore relationships among categorical variables. A chi-square test for independence compares observed frequencies with expected values if there were no association between two categorical variables. The results of the chi-square goodness of analysis were reported by using 2 x 2, 2 x3, and 2 x 4 crosstabulation tables. A Pearson Chi-square value was provided. In order to be statistically significant, the probability value for the Pearson Chi-Square statistic (*p*) has to be smaller than .05.

Logistic regression was used to examine how well the independent variables accurately predicted the dependent variables. The goal of using regression in this study is to test the hypotheses and to examine the strength of potential modifying variables. Binary logistic regression, where a categorical response, which allows for the idea of prediction of a chance, probability, proportion or percentage, was used to screen predictor variables and test potential modifying variables for predictive value. The dependent variable in logistic regression is discrete, and the independent variables are either discrete, continuous or both. In the two models the dependent variables are accessing palliative care consult, (yes/no), and Admission to a palliative care unit (yes/no). Logistic regression does not require that variables are normally distributed or assume homoscedasticity. The impact of predictor variables is explained in terms of odds ratios.

The natural log of the odds of an event equals the natural log of the probability of the event occurring divided by the probability of the event not occurring. The odds ratio is the ratio of the odds of an event occurring in one group to the odds of it occurring in another group. The term is also used to refer to sample-based estimates of this ratio. These groups must be of a dichotomous classification. If the probabilities of the event in each of the groups are p_1 (first group) and p_2 (second group), then the odds ratio is:

$$\frac{p_1/(1-p_1)}{p_2/(1-p_2)} = \frac{p_1/q_1}{p_2/q_2} = \frac{p_1 q_2}{p_2 q_1},$$

where $q_x = 1 - p_x$. An odds ratio of 1 indicates that the condition or event under study is equally likely to occur in both groups. An odds ratio greater than 1 indicates that the condition or event is more likely to occur in the first group. And an odds ratio less than 1 indicates that the condition or event is less likely to occur in the first group.

Binary logistic regression was run because the dependent variable for each model (pc consult = 1/ no pc consult = 0) and (pcu access = 1, no pcu access = 0) is nominal. In order to develop “best”- fitting models, ones that do the best job of prediction with the fewest predictors, a block-entry chi-square test was used to test the models for goodness-of-fit. The Wald chi-squared (χ^2) test is used to ascertain whether or not relationships exist between the proportions of cases that have a dichotomous outcome (Hulley, Cummings, Browner, Grady Hearst & Newman, 2001; Polit & Hungler, 1999). The recommended test for overall fit of a binary logistic regression model is the Hosmer and Lemeshow chi-square test (Tabachnick & Fidell, 2001) which divides subjects into deciles based on predicted probabilities and is considered more robust than the traditional chi-square test. A finding of non-significance corresponds to a finding that the model adequately fits the data. A finding of poor fit is indicated by a significance value less than .05. The Cox & Snell R Square and the Nagelkerke R Square were reported, which provide an indication of the amount in the dependent variable explained by the model. Results from the Classification table were also reported, which provides the percentage of cases overall that are accurately predicted in the model. The final variables in the equation were reported using the *b* values, which indicates the direction of a relationship, whether positive or negative. The standard error was provided, then the Wald statistic, with degrees of freedom and the *p* statistic (level of significance). The odds ratio was reported along with the 95% confidence level for the odds ratio.

Limitations

This study used a non-experimental design, which relative to experimental and quasi-experimental research is not as useful in revealing causal relationships. History was also a possible internal threat to the validity of this study, as palliative care becomes more accepted in a hospital setting, access will also increase. There are definitional issues which limit research generalizability in palliative care. This focus limits generalizability to the types of palliative care services offered by the VCU Medical Center, which include a dedicated palliative care unit and a palliative care consult. While other sub-specialties have historically agreed on clinical definitions for key constructs in their fields, palliative care research has been shaped by different models of service delivery. There is heterogeneity in types of palliative care services are offered, both by distinct types of palliative care services that are offered by the model of health system in the country the research has been based in.

This study focused on patients who were admitted to a hospital-based palliative care unit in a large urban teaching hospital environment and then died (decedents). Designing a study using data on all patients who access sentinel events such as a palliative care consult and admission to a palliative care unit, regardless of outcome, would be less biased. However, a study of patients in a time frame leading up to death differs from a study of patients who are defined by a disease characteristic or event that identifies them as dying.

CHAPTER 4: RESULTS

Introduction

Chapter four describes the data preparation and the results of the statistical analyses addressing patterns of access for patients to palliative care in a large urban teaching hospital. The chapter begins with an explanation of the data screening and merging process. A descriptive review of the dependent variables follows. Then descriptive analysis including chi-square crosstabulation for each of the independent variables is provided. This leads to an analysis of potential mediating variables to be included in the logistic regression models. The models for the results of the logistic regression analysis are described, and the odds ratios for variables are provided. The Group One hypotheses represent decedents who received palliative care consults provided by the Palliative Care Team established on January 1, 2006. The Group Two hypotheses represent decedents who were admitted to the Palliative Care Unit from its inception on May 1, 2000.

Review of the Data Source

The initial data set of 11,388 decedents at VCU Health System (VCUHS) with date of death from May 2, 1997 through August 28, 2011 was compiled by the VCU Massey Cancer Center Analysis Office. The Massey Data Analysis System (MDAS) incorporates data from several sources across VCUHS, including the Program & Activity

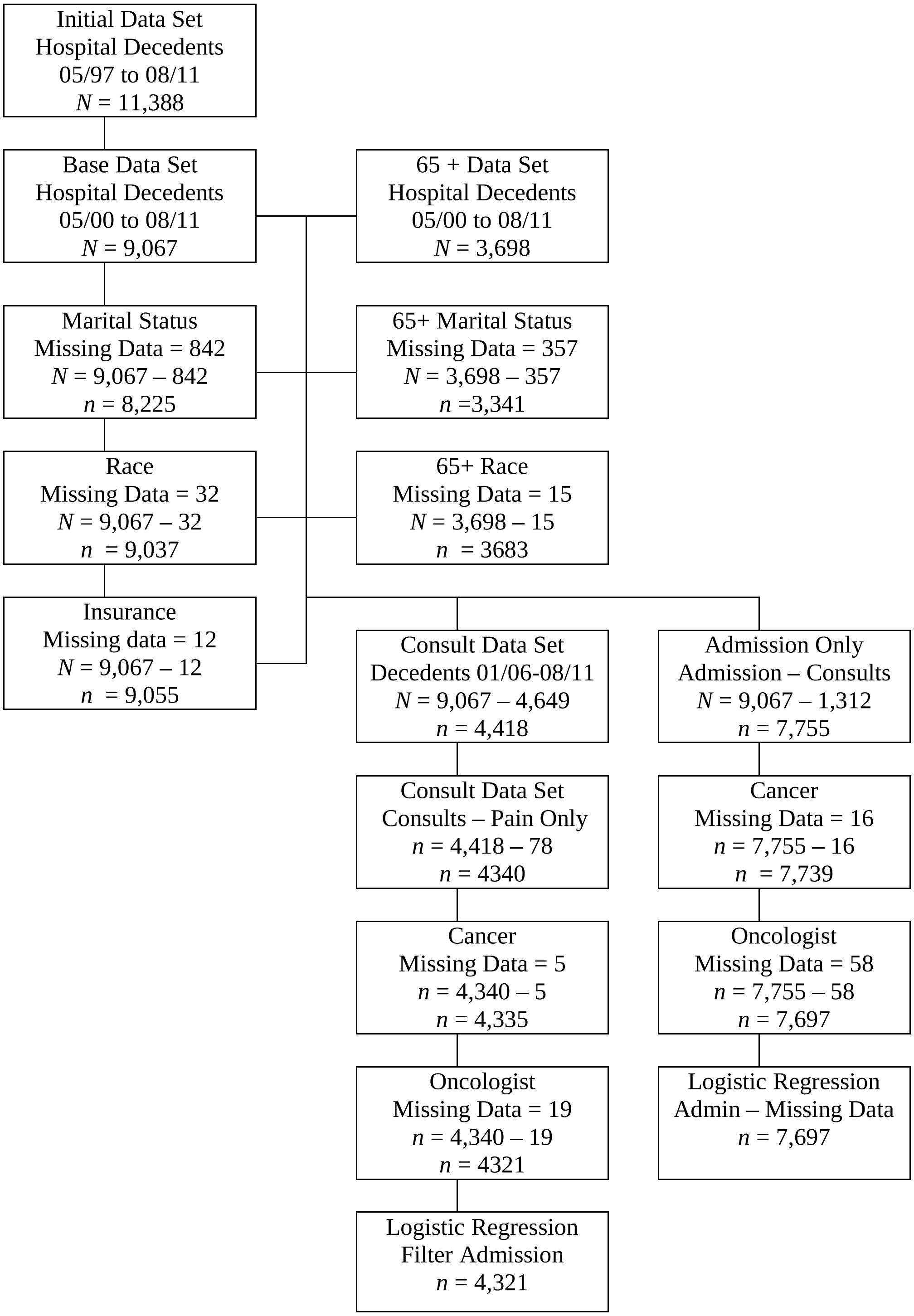
Reporting System (PARS) the hospital billing system until July 2008, and Hospital Patient Accounting System (HPA) the billing system that replaced PARS, the Hospital billing system. The data related to consults were entered into Excel files by the Palliative Care Team secretary who sends the data to MDAS on a monthly basis. There were 38 initial variables, which were included in a data dictionary (Appendix 1). The first iteration of the data set eliminated all decedents prior to the opening of the palliative care unit on May 1, 2000, through August 28, 2011. This base data set (N= 9,067), included decedents a) who received a palliative care consult, b) who received a palliative care consult and were admitted to the palliative care unit, c) who were admitted to the palliative care unit without consult, and d) none of the above. This set was used for descriptive analysis of the variables, and for cross tabulation of dependent and independent variables. The data tree (Table 2) provides a synopsis of major adjustments to the original data set. The data screening process included an initial subtraction of 78 consults because they were coded as “Pain Only”. Approximately 75% of these consults were requested for trauma related issues, auto accidents etc, and did not require any other palliative care services.

Dependent Variables

There were 1,312 decedents who received a palliative care consult (14.4%) and 2,515 decedents who were admitted to the palliative care unit (27.7%). Eight hundred and one (801, 8.8%) decedents received both a palliative care consult and were admitted to the palliative care unit. The dependent variables were divided into four categories for

Table 2

Data Tree



regression analysis and used for chi-square tests of independence for the cancer variables in order to address variance in the dependent variables.

Palliative Care Consult

The first reported consult for a decedent occurred on January 4, 2006. Prior to 2006, palliative care consults were not collected for research purposes. There were a total of 4,418 decedents between January 2006 and August 2011, of which 78 consults were omitted because they were coded “Pain Only.” Therefore, the population for consults analyzed was N = 4,340 (4,418 – 78 = 4,340).There were a total of 1,312 consults between January 2006 and June 24, 2011. Of these consults, 511 (38.9%) received a consult only, and 801 (61.1%) received a consult and were admitted to the palliative care unit.

Admission to the Palliative Care Unit

The base data set (N=9,067) was used for descriptive analysis of admission data. There were 2,446 admissions to the palliative care unit with at least one billable day and 46 admissions whose last unit at death was palliative care, but who were not charged for a billable day. The base data set included 1714 admission only decedents and 801 consult and admission decedents. For logistic regression analysis, all missing data and outliers from variables were deleted.

Independent Variables

The independent variables are divided into individual characteristics based on the Behavioral Model of Health Services Use (Andersen & Davidson, 2007). The initial categories, age, gender, marital status, and race are considered predisposing characteristics. The insurance variable is considered an enabling resource in the model, and evaluated need is captured by types of cancer and categories of physician referral.

Predisposing Characteristics

Age Variable

An initial chi-square test of independence was performed to examine the relation of age and palliative care consult. The relation between these variables was statistically significant ($p < .001$) for three age groups, decedents less than 65 years of age, those 65 to 84 years of age, and 85 and above (Table 3). While 38.5% of decedents 85 or over received a palliative care consult, 25.8% of decedents under 65 received a consult. The decedents age 85 and over contributed most to the statistical significance of the chi-square analysis. The actual count (38.5%) was substantially higher than the expected count (28.4%), while the observed and expected counts for decedents under age 65 (28.4% vs. 25.8%) and age 65 to 84 (30.8% vs. 28.4%) were comparable.

Table 3

Proportion of Decedents Receiving Consults Within Age Groups

Characteristic		Consult – No	Consult – Yes	Total
Under 65	Count	1877 (74.2%)	653 (25.8%)	2530
	Expected Count	1811 (71.6%)	719 (28.4%)	
65-84	Count	1044 (69.2%)	465 (30.8%)	1509
	Expected Count	1079.9 (71.6%)	429.1 (28.4%)	
85 and over	Count	185 (61.5%)	116 (38.5%)	301
	Expected Count	215.4 (71.6%)	86 (28.4%)	

$n = 4{,}340$, $\chi^2(2) = 27.865$, $p < .001$, (% within age group).

A chi-square test of independence was then performed to examine the relation of age and admission to the palliative care unit (Table 4). The relation between these variables was also statistically significant (*p* < .001) for three age groups, decedents less than 65, 65 to 84, and 85 and above. While 30.9% of decedents 85 and over were admitted to the palliative care unit, 23.4% of decedents under 65 were admitted. The decedents age 85 and over contributed most to the statistical significance of the chi-square analysis. The actual count (30.9%) was substantially higher than the expected count (25.2%), while the observed and expected counts for decedents under age 65 (23.4% vs. 25.2%, respectively) and age 65 to 84 (25.2% vs. 27.1%, respectively) were comparable.

Table 4

Proportion of Decedents Admitted to the Palliative Care Unit Within Age Groups

Characteristic		Admission – No	Admission – Yes	Total
Under 65	Count	4,115 (76.6%)	1,255 (23.4%)	5370
	Expected Count	4,019.1 (74.8%)	1,350.9 (25.2%)	
65 to 84	Count	2,262 (72.9%)	843 (27.1%)	3105
	Expected Count	2,323.9 (74.8%)	781.1 (25.2%)	
85 and over	Count	409 (69.1%)	183 (30.9%)	592
	Expected Count	443.1 (74.8%)	148.9 (25.2%)	

N = 9,067, $\chi^2(2) = 26.065$, *p* < .001, (% within age group).

Another analysis was conducted comparing the older adults (65-84) to the oldest old (85 and over). A chi-square test of independence was performed to examine the relation of these two age groups and palliative care consult. The relationship between these variables was statistically significant (*p* < .01; Table 5). Decedents 85 and over

Table 5

Proportion of Decedents 65 to 84 Receiving a Consult Compared to Decedents 85 and Over Receiving a Consult

Characteristic	Consult – No	Consult – Yes	Total
65-84	1,044 (69.2%)	465 (30.8%)	1,509
85 and over	185 (61.5%)	116 (38.5%)	301

n = 1810, $\chi^2(1) = 6.867$, $p = .009$, (% within age group).

(38.5%) were more likely to receive palliative care consults than decedents aged 65 to 84 (30.8%).

A chi-square test of independence was then performed to examine the relation of age and admission to the palliative care unit among the old and the oldest old. The relation between these variables was not statistically significant ($p > .05$; Table 6). Decedents 85 and older (30.9%) were as likely to be admitted to the palliative care unit as decedents 65 to 84 (27.1%).

Table 6

Proportion of Decedents 65 to 84 Compared to Decedents Over 85 Admitted to a Palliative Care Unit

Characteristic	Admission – No	Admission – Yes	Total
65-84	2,262 (79.3%)	843 (27.1%)	3,105
85 and over	409 (69.1%)	183 (30.9%)	592

n = 3,697, $\chi^2(1) = 3.510$ $p = .061$, (% within age group).

Gender Variable

An initial chi-square test of independence was performed to examine the relation of gender and palliative care consult among all age groups (Table 7). The relation between these variables was not statically significant ($p > .05$). Female decedents

Table 7

Gender of Decedents who Received a Palliative Care Consult

Characteristic	Consult – No	Consult – Yes	Total
Male	1,758 (71.8%)	691 (28.2%)	2,449
Female	1,348 (71.3%)	543 (28.7%)	1,891

n = 4,340, $\chi^2(1)$ = 0.131, p = .718, (% within gender group).

(28.7%) were as likely to receive a palliative care consult as were male decedents (28.2%).

A chi-square test of independence was then performed to examine the relation of gender and admission to the palliative care unit. The relation between these variables was statistically significant (Table 8; $p < .001$). Female decedents (27.1%) were more likely to be admitted to the palliative care unit than male decedents (23.6%).

Table 8

Gender of Decedents who were Admitted to a Palliative Care Unit

Characteristic	Admission – No	Admission – Yes	Total
Male	3,829 (76.4%)	1,184 (23.6%)	5,013
Female	2,957 (72.9%)	1,097 (27.1%)	4,054

N = 9,067, $\chi^2(1)$ = 14.096, $p < .001$, (% within gender group).

A chi-square test of independence was performed to examine the relation of gender and palliative care consult among the oldest age groups (Table 9). The relationship among these two variables was not significant. ($p > .05$). Male decedents 65 and older (17.2%) were as likely to receive consults as female decedents (15.3%).

Another chi-square test of independence was performed to examine the relation of gender and palliative care admission among the two oldest age groups (Table 10). The relationship among these two variables was statistically not significant (p > .05).

Table 9

Gender of Decedents 65 and Older who Received a Palliative Care Consult

Characteristic	Consult – No	Consult – Yes	Total
Male	623 (82.8%)	301(17.2%)	924
Female	606 (84.7%)	280 (15.3%)	886

n = 1,810, $\chi^2(1) = .196$, *p* = .658, (% within gender group).

Table 10

Gender of Decedents 65 and Older who were Admitted to a Palliative Care Unit

Characteristic	Admission – No	Admission – Yes	Total
Male	1,331 (76.4%)	479 (23.6%)	1,810
Female	1,340 (72.9%)	547 (27.1%)	1,887

n = 3697, $\chi^2(1) = 2.935$, *p* = .087, (% within gender group).

Older adult female decedents (27.1%) were as likely to be admitted to the palliative care unit as male decedents (23.6%).

Marital Variable

The initial data for marital status (Table 11) was recoded to become a Dichotomous variable (Table 12).

Chi-square tests were performed for marital status for both consults (Table 13) and admissions for all ages (Table 14). There were no statistically significant results for either of these variables ($p > .05$). Marital status was not considered as a variable for logistic regression because the percentage of missing data (6.8%) was above the maximum level suggested (Tabachnick & Fidel, 2001).

Table 11

Marital Status of Decedents

Status	Percentage of Total	*n*
Married	38.2%	3,466
Single	29.2%	2,650
Widowed	13.0%	1,175
Divorced	7.7%	697
Separated	2.6%	233
Life Partner	.0%	4
Unknown	5.2%	452
Missing Data	4.3%	390
Total	100%	9,067

Table 12

Marital Status Recoded

Status	Percentage of Total	*n*
Not Married	52.4%	4,755
Married/ Partner	38.3%	3,470
Unknown/Missing Data	9.3%	843
Total	100%	9,067

Table 13

Marital Status of Decedents who Received a Palliative Care Consult

Characteristic	Consult – No	Consult – Yes	Total
Not Married	1616 (85.0%)	667 (15.0%)	2,283
Married	1257 (85.3%)	506 (15.4%)	1,763

$n = 4{,}046$, $\chi^2(1) = 0.128$, $p = 0.720$, (% within marital group) (Missing Data, $n = 294$).

Table 14

Marital Status of Decedents who were Admitted to a Palliative Care Unit

Characteristic	Admission – No	Admission – Yes	Total
Not Married	3,514 (73.9%)	1,240 (26.1%)	4,754
Married	2,553 (73.6%)	917 (26.4%)	3,470

$n = 8{,}224$, $\chi^2(1) = 0.122$, $p = 0.727$, (% within marital group) (Missing Data, $n = 842$).

Chi-square tests were then performed for marital status for both consults and admissions for decedents who were 65 and older (Table 15; Table 16). This analysis followed the same pattern as the examination of the data set that included the all ages data set. There were no statistically significant results for either of these variables ($p >$ .05). Once again, regression analysis was not considered because of the large number of missing data (6.4%).

Table 15

Marital Status of Decedents 65 and Older who Received a Palliative Care Crosstabulation

Characteristic	Consult – No	Consult – Yes	Total
Not Married	577(67.7%)	275 (32.3%)	852
Married	568(67.4%)	275 (32.6%)	843

n = 1,695, $\chi^2(1)$ = 0.023, p = .880, (% within marital group) (Missing Data, n = 115).

Table16

Marital Status of Decedents 65and Older who were Admitted to a Palliative Care Unit

Characteristic	Admission – No	Admission – Yes	Total
Not Married	1,266 (71.1%)	515 (28.9%)	1,781
Married	1,127 (72.3%)	432 (27.7%)	1,559

n = 3,340, $\chi^2(1)$ = 595, p = .440, (% within marital group) (Missing Data, n = 357).

Race Variable

Initial frequency analysis of the race variable in the base data set found that African American and White non-Hispanic decedents made up 94.7% of the population. It was determined that in order to dichotomize the data for analysis, African American, Hispanic, Asian and “other” decedents (Table 17) would be recoded as “African American & Other” decedents (Table 18).

Table 17

Race of Decedents

Race	Percentage of Total	n
African American	48.3%	4,376
White non-Hispanic	46.4%	4,208
Hispanic	3.0%	268
Asian	.4%	33
Other	1.7%	152
Missing Data	.3%	30
Total	100%	9,067

Table: 18

Race of Decedents Recoded

Race	Percentage of Total	n
African American & Other	53.3%	4,829
White non-Hispanic	46.4%	4,208
Missing Data	.3%	30
Total	100%	9,067

An initial chi-square test of independence was performed to examine the relation of race and palliative care consult among all age groups (Table 19). The relationship between these variables was statistically significant ($p < .05$). African American & Others (26.7%) were less likely to receive a palliative care consult than White non-Hispanics (30.3%).

A chi-square test of independence was then performed to examine the relation of race and admission to the palliative care unit (Table 20). The relationship among these two variables was not statistically significant ($p > .05$). African American & Others

Table 19

Proportion of Minority Decedents Compared to White non-Hispanic Decedents who Received a Palliative Care Consult

Characteristic	Consult – No	Consult – Yes	Total
Af. Am. & Others	1,633 (73.3%)	595 (26.7%)	2,228
White non-Hispanic	1,462 (69.7%)	637 (30.3%)	2,099

$n = 4{,}327$, $\chi^2(1) = 7.040$, $p = .008$, (% within race group) (Missing Data, $n = 13$).

Table 20

Proportion of Minority Decedents Compared to White non-Hispanic Decedents who were Admitted to a Palliative Care Unit

Characteristic	Admission – No	Admission – Yes	Total
Af. Am. & Others	3,630 (75.2%)	1,199 (24.8%)	4,829
White non-Hispanic	3,128 (74.4%)	1,079 (25.6%)	4,207

$n = 9{,}036$, $\chi^2(1) = 0.799$, $p = .371$, (% within race group) (Missing Data, $n = 32$).

(24.8%) were as likely to be admitted to the palliative care unit as White non-Hispanics (25.6%).

A chi-square test of independence was then performed to examine the relation of race and palliative care consult among decedents 65 and over (Table 21). The relationship among these two variables was not statistically significant ($p > .05$). African American & Other decedents (30.3%) were as likely to receive a palliative care consult as White non-Hispanic decedents (33.8%).

A chi-square test of independence was then performed to examine the relation of race, for those 65 and over, and admission to the palliative care unit (Table 22). The relationship among these two variables was not statistically significant ($p > .05$).

Table 21

Proportion of Minority Decedents 65 and Over Compared to White non-Hispanic Decedents 65 and Over who Received a Palliative Care Consult

Characteristic	Consult – No	Consult – Yes	Total
Af. Am. & Others	604 (69.7%)	263 (30.3%)	867
White non-Hispanic	619 (66.2%)	316 (33.8%)	935

n = 1,802, $\chi^2(1)$ = 2.43, *p* = .116, (% within race group) (Missing Data, *n* = 15).

Table 22

Proportion of Minority Decedents 65 and Over Compared to White non-Hispanic Decedents 65 and Over who were Admitted to a Palliative Care Unit

Characteristic	Admission – No	Admission – Yes	Total
Af. Am. & Others	1,326 (72%)	516 (28%)	1,842
White non-Hispanic	1,332 (72.4%)	508 (27.6%)	1,841

n = 3,682, $\chi^2(1)$ = 0.075, *p* = .784, (% within race group) (Missing Data, *n* = 15).

African American & Other decedents (28%) were as likely to be admitted to the palliative care unit as White non-Hispanics (27.6%).

Enabling Resources

The health insurance variable was divided into seven different categories (Table 23), with Medicare covering almost half (48.3%) of the decedent population. The variable was recoded (Table 24) to capture insurance versus no insurance.

An initial chi-square test of independence was performed to examine the relation of insurance and palliative care consult among all age groups (Table 25). The relationship between these variables was statistically significant (*p* < .001). Decedents who were insured (15.3%) were more likely to receive a palliative care consult than decedents who were not insured (7.7%).

Table 23

Health Insurance Status of Decedents

Type of Insurance	Percentage of Total	
Medicare	48.3%	4,384
Medicaid	12.0%	1,091
Commercial/HMO	20.9%	1,891
Indigent/Self Pay	11.2%	1,012
Corrections	3.2%	293
Military	.2%	16
Other	4.1%	368
Missing Data	.1%	12
Total	100%	9,067

Table 24

Decedents with Health Insurance Compared to Decedents without Health Insurance

Insured vs. Not Insured	Percentage of Total	n
Not Insured	11.2%	1,012
Insured	88.7%	8,043
Missing Data	.1%	12
Total	100%	9,067

Table 25

Proportion of Decedents who were Insured Compared to Decedents who were Not Insured and Received a Palliative Care Consult

Enabling Resource	Consult – No	Consult – Yes	Total
Not Insured	337 (82.2%)	73 (17.8%)	410
Insured	2,768 (70.4%)	1,161 (29.6%)	3,927

n = 4,339, $\chi^2(1)$ = 25.163, $p < .001$, (% within insurance group) (Missing Data, n = 1).

A chi-square test of independence was then performed to examine the relation of insurance and admission to the palliative care unit (Table 26). The relationship between

Table 26

Proportion of Decedents who were Insured Compared to Decedents who were Not Insured and were Admitted to a Palliative Care Unit

Enabling Resources	Admission – No	Admission – Yes	Total
Not Insured	846 (83.6%)	166 (16.4%)	1,012
Insured	5,928 (73.7%)	2,114 (26.3%)	8,042

n = 9,054, $\chi^2(1) = .46.607$, *p* < .001, (% within insurance group) (Missing Data, *n* = 13).

these variables was statistically significant (*p* < .001). Decedents who were insured (26.3%) were more likely to be admitted to the palliative care unit than decedents who were not insured (16.4%).

An initial chi-square test of independence was performed to examine the relation of insurance and palliative care consult among decedents 65 and older (Table 27). The relationship between these variables was not statistically significant (*p* > .05). The minimum expected cell frequency for chi-square was violated because the cell count for decedents who were not insured and received a consult (*n* = 2) was below 5.

Table 27

Proportion of Decedents 65 and Over who were Insured Compared to Decedents 65 and Over who were Not Insured and Received a Palliative Care Consult

Enabling Resource	Consult – No	Consult – Yes	Total
Not Insured	8 (80%)	2 (20%)	40
Insured	1,221(67.8%)	579 (32.2%)	3658

n = 1,810, $\chi^2(1) = 0.675$, *p* = .411, (% within insurance group).

A chi-square test of independence was then performed to examine the relation of insurance, for decedents 65 and over, and admission to the palliative care unit (table 28). The relationship between these variables was not statistically significant because the

Table28

Proportion of Decedents 65 and Over who were Insured Compared to Decedents 65 and Over who were Not Insured and were Admitted to a Palliative Care Unit

Enabling Resources	Admission – No	Admission – Yes	Total
Not Insured	35 (87.5%)	5 (12.5%)	40
Insured	2,639 (72.1%)	1,021 (27.9%)	3,657

n = 3697, $\chi^2(1) = 4.692$, *p* = .030, (% within insurance group).

small number of uninsured decedents over 65 (*n* = 5) was less than the minimum expected count of 11.10.

Evaluated Need

Solid Cancer and Hematologic Malignancy

An analysis was conducted comparing decedents without cancer (69.4%) versus decedents with solid cancer (22.7%) and decedents with a Hematologic malignancy anywhere among the diagnoses (7.7%; Table 29).

Table 29

Decedents Cancer Diagnoses

Cancer Type	Percentage of Total	n
No Cancer	69.4%	6,296
Solid Cancer	22.7%	2,055
Hematologic Malignancy	7.7%	700
Missing Data	.2%	16
Total	100%	9,067

A chi-square test of independence was performed to examine the relation between solid and Hematologic cancers anywhere among the diagnoses for decedents who received a palliative care consult. The relation between these variables was statistically significant (Table 30; *p* < .001)). Decedents with Hematologic malignancies anywhere

Table 30

Proportion of Decedents who have Solid and Hematologic Cancer as a Diagnoses or No Cancer who Received a Palliative Care Consult

Evaluated Need		Consult – No	Consult – Yes	Total
Solid Cancer	Count	572 (58.1%)	4 13 (41.9%)	985
	Expected Count	704.2 (71.5%)	280.8 (28.5%)	
Hematologic	Count	288 (76.4%)	89 (23.6%)	377
	Expected Count	269.5 (71.5%)	107.5 (28.5%)	
No Cancer	Count	2,229 (75.3%)	730 (24.7%)	2,959
	Expected Count	2,115.3 (71.5%)	843.7 (28.5%)	

n = 4,321, (count after January, 2006) $\chi^2(2) = 111.988$, *p* < .001, (% within cancer group), (Missing Data, *n* = 5).

among the diagnoses (23.6%) and decedents with no cancer (24.7%) are less likely to receive a palliative care consult than decedents with solid cancers anywhere among the diagnoses (41.9%; *p* <.001). The decedents who had a solid cancer anywhere among their diagnosis contributed most to the statistical significance of the chi-square analysis. The actual count (41.9%) was substantially higher than the expected count (28.5%), while the observed counts for hematologic malignancy (23.6%) and no cancer (24.7%) were lower than the expected count, but still comparable.

A chi-square test of independence was then performed to examine the relation between solid and Hematologic cancers anywhere among the diagnoses for decedents who were admitted to a palliative care unit (Table 31). Again, the relation between these variables was statistically significant (*p* < .001). Decedents with no cancer (14.3%) and decedents with Hematologic malignancies anywhere among the diagnoses (23.8%) are less likely to be admitted to a palliative care unit than decedents with solid cancers anywhere among the diagnoses (48.7%). The decedents who had a solid cancer anywhere

Table 31

Proportion of Decedents who have Solid and Hematologic Cancer as a Diagnoses or No Cancer who were Admitted to a Palliative Care Unit

Evaluated Need		Admission – No	Admission – Yes	Total
Solid Cancer	Count	819 (51.3%)	777 (48.7%)	1596
	Expected Count	1,241.8 (77.8%)	354.2 (22.1%)	
Hematologic	Count	455 (76.2%)	142 (23.8%)	597
	Expected Count	464.5 (77.8%)	132.5 (22.1%)	
No Cancer	Count	4,715 (85.7%)	789 (14.3%)	5504
	Expected Count	4,282.6 (77.8%)	1,221.4 (22.1%)	

n = 7,697, (May, 2000) χ^2 (2) = 846.401, $p < .001$, (% within cancer group), (Missing Data, *n* = 16).

among their diagnosis and those with no cancer contributed most to the statistical significance of the chi-square analysis. The actual count (48.7%) was substantially higher than the expected count (22.1%), while the observed counts for hematologic malignancy (23.8%) was comparable, and the count for no cancer (14.3%) was significantly lower than expected.

Admitting Attending Physicians

An initial chi-square test of independence was performed to examine the relation between admitting attending physicians and decedents who received a palliative care consult (Table 32). The admitting attending physicians were divided into two dichotomous groups, cancer specialists and others. The relation between these variables was statistically significant ($p < .001$). Decedents who have an oncologist as an admitting attending physician (31.8%) are more likely to receive a palliative care consult than decedents who have other attending physicians as an admitting attending physician (26.9%).

Table 32

Proportion of Oncologists Compared to other Attending Physicians who Referred Decedents for a Palliative Care Consult

Evaluated Need	Consult – No	Consult – Yes	Total
Oncologist	994 (68.2%)	463 (31.8%)	1,457
Other Attending	2,095 (73.1%)	769 (26.9%)	2,864

n = 4,321, $\chi^2(1) = 11.502$, *p* < .001, (% within attending group), (Missing Data, *n* = 19).

An initial chi-square test of independence was performed to examine the relation between admitting attending physicians and decedents who were admitted to the palliative care unit (Table 33). The admitting attending physicians were divided into two dichotomous groups, Oncologists and others. The relation between these variables was statistically significant (*p* < .001). Decedents who have an oncologist as an admitting attending physician (32.4%) are more likely to be admitted to the palliative care unit than decedents who have other physicians as an admitting attending physician (16.5%).

Table 33

Proportion of Oncologists Compared to other Attending Physicians who Admitted Decedents to a Palliative Care Unit

Evaluated Need	Admission – No	Admission – Yes	Total
Oncologist	1,864 (67.6%)	894 (32.4%)	2,758
Other Attending	4,125 (83.5%)	814 (16.5%)	4,939

N = 7,697, $\chi^2(1) = 260.22$, *p* < .001, (% within attending group).

Modifying Variables

Medicine, Surgery and Emergency Room Physicians

An initial chi-square test of independence was performed to examine the relation between admitting attending physicians and decedents who received a palliative care consult (Table 34). The admitting attending physicians were divided into three groups,

Table 34

Proportion of Medicine, Surgery and Emergency Medicine Admitting Attending Physicians who Referred Decedents for a Palliative Care Consult

Evaluated Need		Consult No	Consult Yes	Total
Medicine Attending	Count	2,014 (68.8%)	915 (31.2%)	2929
	Expected Count	2,093.9 (71.5%)	835.1(28.5%)	
Surgery Attending	Count	974(76.9%)	293(23.1%)	1,267
	Expected Count	905.8 (71.5%)	361.2 (28.5%)	
Emergency Med	Count	101 (80.8%)	24 (19.2%)	125
	Expected Count	89.4 (71.5%)	35.6 (28.5%)	

N =4,321, $\chi^2(2) = 34.042$, $p < .001$, (% within attending group).

Medicine, Surgery and Emergency Medicine. The relation between these variables was statistically significant ($p < .001$). Admitting attending physicians who were in General Medicine were more likely to request palliative care consults for decedents (31.2%) than admitting attending physicians in Surgery (23.1%) or Emergency Medicine (19.2%). The decedents who had a referral from admitting attending physicians in Emergency Medicine and Medicine contributed most to the statistical significance of the chi-square analysis. The actual count for Emergency Medicine (19.2%) was substantially lower than the expected count (28.5%). The actual count for Surgery (23.1%) was somewhat lower than the expected count, but the actual count for Medicine was marginally higher than the expected count (31.2%). The expected count (28.5%) for decedents referred by the three divisions of admitting attending physicians compared to actual count (31.2% Medicine, 23.1% Surgery, 19.2% ER) receiving a palliative care consult accounted equal variance in the chi-square analysis.

An initial chi-square test of independence was performed to examine the relation between admitting attending physicians and decedents who were admitted to the palliative care unit (Table 35). The admitting attending physicians were divided into three groups, Medicine, Surgery and Emergency Medicine. The relation between these variables was statistically significant ($p < .001$). Admitting attending physicians who were in General Medicine were more likely to refer decedents (27.8%) than admitting attending physicians in Surgery (12.3%) or Emergency Medicine (20.8%). The decedents who were admitted to the palliative care unit by physicians in Surgery and Medicine contributed most to the statistical significance of the chi-square analysis. The actual count (12.3%) was substantially lower than the expected count for Surgery (22.2%). The actual count for Emergency Medicine (20.8%) was lower but comparable to the expected count. Conversely, the actual count for attending physicians in Medicine was higher than the expected count (27.2%).

Table 35

Proportion of Medicine, Surgery and Emergency Medicine Admitting Attending Physicians who Admitted Decedents to a Palliative Care Unit

Evaluated Need		Admission – No	Admission – Yes	Total
Medicine	Count	3,647(72.8%)	1,360 (27.2%)	5007
	Expected Count	3,895.9 (77.8%)	1,111.1(22.2%)	
Surgery	Count	2,178 (87.7 %)	305 (12.3%)	2483
	Expected Count	1932(77.8%)	551(22.2%)	
	Count	164 (79.2%)	43 (20.8%)	207
Emergency Med	Expected Count	161.1(77.8%)	45.9 (22.2%)	

N = 7697, $\chi^2(2)$ = 213.056, $p < .001$, (% within attending group).

Exploratory Variables

ICU and PCU Days

Intensive Care Unit (ICU) days in the base data set (N=9,067), ranged from zero days (N = 2727), to 300 days, (N = 1) the mode was 2 days. In a comparison of PCU and

ICU days, of the 9,067 decedents (Table 36) 72.8% of all decedents who were either admitted to the palliative care unit or the ICU were accounted for. In order to factor in PCU days, a formula was developed to weigh PCU days by subtracting palliative care days from length of stay days and dividing by length of stay. A histogram, a Mahalanobis Distance Stem-and-Leaf Plot and a boxplot were analyzed for variable normality and outliers. The variables were then transformed using square root and logarithm to create a more normal distribution, and outliers were removed from the data set. The Kolmogorov-Smirnov statistic never rose above a value of significance of .001, suggesting violation of the assumption of normality. However, this is often the case in a large data set (Pallant, 2007).

When these weighted and transformed variables were included in the regression analysis, they accounted for close to 100% of the overall predictive value (Nagelkerke R_2 = 98.1%) and "bumped" (Tabachnick & Fidell, 2001) variables that were predictors. The resulting multicollinearity values also indicated a problem (*SE* = 6,046.96; *b* = 4,209.06). Thus, they were not included in the logistic regression model.

Table 36

Length of Stay for ICU and PCU

ICU/PCU Admissions	n	Percentage	Mean	SD
ICU Days	6,340	69.9%	5.93	12.301
PCU Days	2,469	27.2%	11.00	17.321
No PCU or ICU Days	1,338	14.8%	*	*
Either PCU or ICU	6,603	72.8%	*	*
Both PCU and ICU	1,126	12.4%	*	*

N = 9,067 (1,138+6,603+1,126 = 9,067)

Results of Binary Logistic Regression Models

Two data sets were analyzed for the palliative care consult model, one that included only consults and another that included consults and admissions. All consults in the decedent population (*n* = 4,321) was chosen as the best representative of the regression model for the consult regression model. All admissions in the decedent data minus consults and missing data (*n* = 7,697) was chosen as the best representative of the admission regression model. Direct logistic regression was performed to access the impact of a number of factors on the likelihood that a decedent would receive a palliative care consult and admission to a palliative care unit. The models contain ten independent variables representing potential determinants of access to a palliative care consult. This includes three variables representing predisposing characteristics labeled Age, Gender and Race. One variable labeled Insurance vs. Non Insured represents enabling resource.

Two variables represent evaluated need and they are labeled: Cancer Anywhere vs. no cancer and Referral 1, Oncology vs. Others. Cancer Anywhere consists of hematologic cancer anywhere in the diagnoses, solid cancer in the diagnoses, and no cancer. Referral 1 represents oncology referral versus all other referrals. Referral 2, which is a modifying variable, represents medicine referral and surgery referral versus emergency room referral (Table 37). Oncologists are more likely to be categorized as Medicine attending physicians (48.1%), and less likely to be categorized as Surgery attending physicians (3.8%), and none are categorized as ER attending physicians (0%; *p* < 001.).

Table 37

Medicine, Surgery and Emergency Medicine Attending Physicians Compared to Oncologists and Other Attending Physicians

Division		Oncologist	Other Attending	Total
Medicine Attending	Count	1,409 (48.1%)	1,520 (51.9%)	2929
	Expected Count	427.2 (33.7%)	1,941.4 (66.3%)	
Surgery Attending	Count	48 (3.8%)	1,219 (96.2%)	1,267
	Expected Count	427.2 (33.7%)	839.8 (66.3%)	
Emergency Med	Count	0 (0.0%)	125(100.0%)	125
	Expected Count	42.1 (33.7%)	82.9 (66.3%)	

n = 4321,$\chi^2(2)$ = 842.682, p < 001, (% within attending group).

Palliative Care Consult Model

The Logistic Model for the palliative care consult (Table 38) was statistically significant, $\chi^2(10) = 187.222$, $p < .001$, indicating that the model was able to distinguish between decedents who were received a palliative consult and decedents who died elsewhere in the hospital. The model as a whole explained between 4.2% (Cox & Snell R^2) and 6.1% (Nagelkerke R^2) of the variance in palliative care admissions, a relatively small percentage of the variance explained, and correctly classified 71.1% of cases, as the overall percentage correct. Six of the independent variables made unique statistically significant contributions to the model: age 65 to 84, age 85 plus, race, insurance, solid cancer and medicine as the attending admitting physician. The odds ratio for age indicated that 1.232 decedents aged 65 to 84 and over will receive a palliative care consult for every decedent who is under age 65, controlling for other factors in the model, and 1.986 decedents over age 85 will receive a consult for every decedent who is under age 65, controlling for other factors in the model. The odds ratio of .831 for minority decedents was less than 1, which means White non-Hispanic decedents were 1.2

Table 38

Logistic Regression Analysis of Palliative Care Consult

Predictor	B	SE	χ^2_{Wald}	*p*	*OR*	95% CI for EXP (B)	
						Lower	Upper
Predisposing Characteristics							
Age 65 to 84	.209	.076	7.605	**.006****	1.232	1.062	1.430
Age 85 plus	.686	.133	26.707	**.001****	1.986	1.531	2.577
Gender, Male vs. Female	.038	.070	.297	.586	1.039	.905	1.039
Minorities vs. non Hs-W	-.178	.070	6.455	**.011***	.831	.729	.960
Enabling Resources							
Insured vs. Uninsured	.469	.140	11.183	**.001***	1.599	1.214	2.105
Evaluated Need							
Cancer Anywhere vs. No Cancer							
Solid	.750	.081	86.374	**.001****	2.1616	1.807	2.478
Hematologic Malignancy	-.185	.135	1.874	.171	.831	.638	1.083
Referral 1 Oncology vs. Others							
Oncology	-.004	.080	.002	.963	.996	.851	1.166
Modifying Variables							
Referral 2 vs. ER							
Medicine	.599	.237	6.377	**.012***	1.820	1.143	2.896
Surgery	.227	.240	.890	.346	1.254	.783	2.009

*$p < .05$ ** $p < .001$.

(1 /.831) times more likely to receive a palliative care consult than minorities, controlling for other factors in the model. Insured decedents are 1.599 times as likely to receive a palliative care consult as uninsured decedents controlling for other factors in the model. For evaluated need, decedents with a solid cancer are 2.16 times as likely to receive a palliative care consult as decedents without cancer controlling for other factors in the model. For modifying variables, medicine as the admitting attending physician made a statistically significant contribution to the model. The odds ratio of 1.82 indicates that for every Emergency medicine consult requested by an admitting attending physician, there are 1.82 referrals for a palliative care consult by a an admitting attending physician who

is categorized as medicine. The chi-square value for the Hosmer and Lemeshow Goodness of Fit Test supported the model χ^2 (8, N = 4021) = 14.798, p = .063.

Palliative Care Admission Model

Direct logistic regression was performed to access the impact of a number of factors on the likelihood that a decedent would be admitted to the palliative care unit. The full model containing all predictors (Table 39) was statistically significant, χ^2 (10, N=7697) = 959.621, $p < .001$, indicating that the model was able to distinguish between decedents who were admitted to the palliative care unit and those who died without a palliative care consult. The model as a whole explained between 11.7% (Cox & Snell R Square) and 17.9% (Nagelkerke R squared) of the variance in palliative care admissions, and correctly classified 79.9% of the cases as the overall percentage correct.

Eight of the independent variables made a unique statistically significant contribution to the model: age 65 to 84, age 85 and over, gender, insurance, solid cancer as a diagnosis anywhere in the diagnoses, hematologic cancer as a diagnosis anywhere in the diagnoses, oncology as the admitting attending physician and surgery as the admitting attending physician. Age and gender were found to be predisposing characteristics that were predictors of palliative care unit admission. The odds ratio for age indicates that decedents 65 to 84 were 1.286 times more likely to be admitted to the palliative care unit than decedents under 65, controlling for other factors in the model. Decedents 85 and over were 2.006 times more likely to be admitted to the palliative care unit than decedents under 65. Females are 1.128 times more likely to be admitted to the palliative

Table 39

Logistic Regression Analysis of Palliative Care Unit Admission

Predictor	B	SE	χ^2_{Wald}	*p*	*OR*	95% CI for EXP (B)	
						Lower	Upper
Predisposing Characteristics							
Age 65 to 84	.252	.065	14.972	.001**	1.286	1.132	1.461
Age 85 plus	.696	.119	33.981	.001**	2.006	1.587	2.534
Gender, Male vs. Female	-.121	.060	4.094	.043*	.886	.788	.996
Minorities vs. non-Hs W	-.016	.060	.069	.793	.984	.875	1.107
Enabling Resources							
Insurance vs. No Insurance	.306	.106	8.359	.004**	1.358	1.104	1.672
Evaluated Need							
Cancer Anywhere vs. No Cancer							
Solid	1.590	.067	571.066	.001**	4.903	4.304	5.586
Hematologic Malignancy	.350	.109	10.283	.001**	1.420	1.146	1.759
Referral 1 Oncology vs. Others							
Oncology	.323	.068	22.722	.001**	1.381	1.209	1.577
Modifying Variables							
Referral 2 vs. ER							
Medicine	.087	.188	.217	.642	1.091	.755	1.577
Surgery	-.521	.192	7.394	.007**	.594	.408	.865

*$p < .05$ ** $p < .001$.

care unit (*OR* = .886). Insurance was found to be an enabling resource predictor of admission to the palliative care unit. Based on the odds ratio, decedents who have insurance are 1.358 times more likely to be admitted to the palliative care unit than the uninsured controlling for other factors in the model.

The strongest predictor of admission to a palliative care unit was solid cancer as a diagnosis among the decedent's multiple diagnoses, an evaluated need predictor. Decedents with a solid cancer as a secondary diagnosis were 4.903 times more likely to be admitted to the palliative care unit than decedents who did not have a cancer diagnosis. Decedents with a hematologic malignancy were 1.42 times more likely to be admitted to the palliative care unit than decedents without cancer as a diagnosis. Oncologists' referrals were found to be 1.381 times more likely to lead to admission to the palliative care unit than other physicians. Interestingly, in an analysis of the modifying variables, emergency medicine referrals were 1.683 (1 / .594) times more likely than surgery referrals. The chi-square value for the Hosmer and Lemeshow Goodness of Fit Test was 32.416, with a p value < .001, which did not support the model. However, the Omnibus Tests of Model Coefficients contradicted this finding with a chi-square value of 959.621 with a p value < .001.

Analyses of Hypotheses of Palliative Care Consults

The seven individual hypotheses related to palliative care consults are provided with an explanation of the results.

H_1 Older decedents are less likely to receive a palliative care consult. **Rejected**

A chi-square test of independence was performed to examine the relation of age and palliative care consult. The relation between these variables was statistically significant. The oldest old decedents, adults age 85 and over (38.5%, 116/301) were more likely to receive a palliative care consult than both adults age 65 and lower (25.8%, 653/2530) and those age 65 to 84 (30.8%, 465/1509), χ^2 (2) = 27.865, p <001. Regression analysis found that both ages 65 to 84 (p < .006; OR = 1.232) and 85 plus (p < .001; OR = 1.986), were more likely to receive a palliative care consult than decedents under 65.

H_2 Women decedents are more likely to receive a palliative care consult. **Rejected**

A chi-square test of independence was performed to examine the relation of gender to palliative care consult. The relation between these variables was not statistically significant (*p* = .718). Male decedents were as likely to receive a palliative care consult (28.2%, 691/2449) as female decedents (28.7%, 543/1891), χ^2 (1) = .131, *p* = .718. This was confirmed by logistic regression analysis (*p* = .586).

H_3 Married decedents are more likely to receive a palliative care consult. **Rejected**

A chi-square test of independence was performed to examine the relation of married decedents to palliative care consults. Decedents who were married and received a palliative care consult, (15.4%, 506/1763) were as likely as decedents who were not married (15%, 667/2283) to receive a palliative care consult, χ^2 (1) = .128, *p* = .720.This variable was deleted from the logistic regression analysis model due to the high number of missing values.

H_4 Minority decedents are less likely to receive a palliative care consult. **Accepted**

A chi-square test of independence was performed to examine the relation of race to palliative care consults. Minority decedents were less likely to receive a palliative care consult (26.7% 595/2228) than White non-Hispanic decedents (30.3%, 637/2099), χ^2 (1) = 7.040 *p* =.008. This was confirmed by the regression model which found that for every minority decedent who received a palliative care consult 1.206 White non-Hispanic decedents receive a palliative care consult controlling for other factors in the model (*OR* = .831/1; *p* = .011).

H_5 Decedents with no health insurance are less likely to receive a palliative care consult. **Accepted**

A chi-square test of independence was performed to examine the relation of health insurance and palliative care consults. The relation between these variables was statistically significant. Decedents who had health insurance were more likely to receive a palliative care consult (29.6%, 1161/3927), than decedents who did not have health insurance (17.8%, 73/410) χ^2 (1) = 25.163, p <.001. The logistic regression for the palliative care consult model found insurance to be a predictor of palliative care consult. Decedents who are insured are 1.599 times more likely to receive a palliative care consult than decedents who are uninsured, controlling for other factors in the model ($p < .001$).

H_6 Patients with hematologic malignancies are less likely to receive a palliative care consult. **Rejected**

A chi-square tests of independence were performed to examine the relation of hematologic malignancies and palliative care consults. Decedents who had hematologic malignancies anywhere among their diagnosis were less likely to receive a palliative care consult (23.4%, 89/379) than decedents who had solid tumor cancers (41.8%, 413/988) χ^2(2) = 111.988, $p < .001$. However, decedents who had hematologic malignancies were as likely to receive a consult as decedents with no cancer among their diagnoses (24.7%, 732/2968). The logistic regression analysis revealed that cancer anywhere among the diagnoses was statistically significant for solid cancer ($p < .001$) but not hematologic malignancy ($p = .171$).

H_7 Oncologists are more likely to refer patients for a palliative care consult. **Rejected**

A chi-square test of independence was performed to examine the relation of oncologist referral and palliative care consults. The relationship between these variables was statistically significant. Oncologists (31.8%, 463/1457) were more likely to refer patients for a palliative care consult than other attending physicians (26.9%, 769/2864), N = 4321, χ^2 (1) = 11.502, $p < .001$. However, logistic regression analysis does not support the chi-square analysis ($p = .963$).

Analyses of Hypotheses for Palliative Care Unit Admissions

The seven individual hypotheses related to admission to a palliative care unit are provided with an explanation of the results.

H_8 Older decedents are less likely to be admitted to the palliative care unit. **Rejected**

A chi-square test of independence was performed to examine the relation of age and admission to a palliative care unit. The relation between these variables was statistically significant (x^2 (2) = 26.065, $p < .001$). Decedents 85 years of age and over (30.9%, 183/592) were more likely to be admitted to a palliative care unit than decedents under the age of 65(23.4%, 1,255/5371). However, decedents who were over 85, (30.9%, 183/593) were as likely to be admitted to the palliative care unit as decedents who were between the ages of 65 and 84 (27.1%, 843/3015). Regression analysis found that both decedents 65 to 84, ($p < .001$) and decedents over 85 ($p < .001$) were more likely to be admitted to the palliative care unit than decedents under 65 years of age, controlling for other factors in the model.

H_9 Women decedents are more likely to be admitted to the palliative care unit. **Accepted**

A chi-square test of independence was performed to examine the relation of gender and admission to a palliative care unit. The relation between the variables was statistically significant. Women were more likely (27.1%, 1097/4055) to be admitted to the palliative care unit than men (23.6%, 1184/5013), χ^2 (1) = 14.096, $p < .001$. The palliative care admission regression model also found that gender is a predictor of admission to the palliative care unit (*OR* = .886; *p* = .043,). Female decedents are 1.13 (1/.886) times more likely than males to be admitted to the palliative care unit, controlling for other factors in the model.

H_{10} Married decedents are more likely to be admitted to the palliative care unit. **Rejected**

A chi-square test of independence was performed to examine the relation of marriage and admission to a palliative care unit. Results were inconclusive. Decedents who were married and were admitted to the palliative care unit, (26.4%, 917/3470) were as likely as decedents who were not married (26.1%, 1240/4755) to be admitted, χ^2 (1) = .122, *p* = .727. Due to the high number of missing values this independent variable was excluded from the logistic regression analysis.

H_{11} Minority decedents are less likely to be admitted to the palliative care unit. **Rejected**

A chi-square test of independence was performed to examine the relation of race and admission to a palliative care unit. Decedents from culturally diverse backgrounds (24.8%, 1199/4829) were equally likely to be admitted to the palliative care unit as White non-Hispanic decedents (25.6%, 1079/4208), χ^2(1) = 0.799, *p* = .371. The logistic regression analysis also indicated this independent variable to be statistically not statistically significant (p = .793).

H_{12} Decedents who have no form of insurance are less likely to be admitted to the palliative care unit. **Accepted**

A chi-square test of independence was performed to examine the relation of insurance and admission to a palliative care unit. The relation between these variables was statistically significant. Decedents who had health insurance were more likely to be admitted to the palliative care unit (26.3%, 2144/8043), than decedents who did not have health insurance (16.4%, 166/1012) χ^2 (1) =46.607, $p < .001$. The palliative care unit admission regression model found that insurance is a predictor of admission to the palliative care unit (p = .004). For every uninsured decedent admitted to the palliative care unit, 1.358 insured decedents will be admitted to the palliative care unit, controlling for other factors in the model.

H_{13} Patients with Hematologic malignancies are less likely to be admitted to the palliative care unit. **Rejected**

A chi-square test of independence was performed to examine the relation of Hematologic malignancies and admission to a palliative care unit. The relation between the variables was statistically significant. Decedents who had a solid cancer anywhere among their diagnoses (48.7%,777/1596) were more likely to be admitted to a palliative care unit than decedents with no cancer in their diagnoses (14.3%, 789/5504; $\chi^2(2)$ = 846.401, $p < .001$). The lack of difference between expected and observed makes the comparison with the hematologic group irrelevant to the chi-square solution. The logistic regression analysis model indicated that hematologic cancer was statistically significant in the model of indicators ($p < .001$). Decedents with hematologic malignancy in their diagnoses were 1.42 times more likely to be admitted to the palliative care unit than Decedents without cancer anywhere in their diagnoses.

H_{14} Oncologists are more likely to admit patients to the palliative care unit. **Accepted**

A chi-square test of independence was performed to examine the relation of oncologist referral and admission to a palliative care unit. The relationship between these variables was statistically significant. Oncologists (32.4%, 894/2758) were more likely to refer patients for admission to the palliative care unit than other attending physicians (16.5%, 814/4939), N = 7697, χ^2 (1) = 260.22, $p < .001$. Logistic regression analysis supported this result controlling for other factors in the model ($OR = 1.381$, $p < .001$).

Conclusion

This chapter outlined the designs and methods used to measure the predictors of access to palliative care within a large urban public teaching hospital. Chapter Four tests multiple hypotheses measuring the roles that predisposing, enabling, and evaluated need characteristics played in a palliative care consult and the admission to the palliative care unit. Two logistic regression models testing independent and modifying variables as predictors of access to palliative care will be provided. The results of the analyses (Table 40) are discussed in Chapter Five.

Table 40

Study Hypothesis and Summary of Results

H_1 Older decedents are less likely to receive a palliative care consult.	Rejected
H_2 Women decedents are more likely to receive a palliative care consult.	Rejected
H_3 Married decedents are more likely to receive a palliative care consult.	Rejected
H_4 Minority decedents are less likely to receive a palliative care consult.	Accepted
H_5 Decedents with no health insurance are less likely to receive a palliative care consult.	Accepted
H_6 Patients with Hematologic malignancies are less likely to receive a palliative care consult.	Rejected
H_7 Oncologists are more likely to refer patients for a palliative care consult.	Rejected
H_8 Older decedents are less likely to be admitted to the palliative care unit.	Rejected
H_9Women decedents are more likely to be admitted to the palliative care unit.	Accepted
H_{10} Married decedents are more likely to be admitted to the palliative care unit.	Rejected
H_{11} Minority decedents are less likely to be admitted to the palliative care unit.	Rejected
H_{12}Decedents who have no form of insurance are less likely to be admitted to the palliative care unit.	Accepted
H_{13} Patients with Hematologic malignancies are less likely to be admitted to the palliative care unit.	Rejected
H_{14} Oncologists are more likely to admit patients to the palliative care unit.	Accepted

CHAPTER FIVE: DISCUSSION AND CONCLUSIONS

Chapter Five presents an overview of the problem and then follows with a review of the research question and theoretical framework. A summary of the study follows and conclusions are drawn from the findings presented in Chapter Four. The relationships between the hypotheses and the theoretical framework are reviewed. To conclude, implications and recommendations for further research are discussed weighing study limitations.

Overview of the Problem

Palliative care is a paradigm of care that is becoming more common in the acute care hospital setting. Holistic in nature, palliative care attempts to manage all symptoms of serious ill patients with a measured biopsychosocial and spiritual approach. Barriers to utilizing palliative care services in the acute care setting are numerous: There is a lack of understanding end-of-life care needs among professionals, resistance by some physicians to transition patients to a palliative care setting, even when it is in the patients' best interests, reluctance by patients and family members to palliative care consults and referral because of misunderstanding of what these services offer and the association of palliative care with imminent death, a perception that palliative care only addresses needs of cancer patients, and finally, cultural and socioeconomic barriers, such as educational levels, income and health insurance. Patients must address the stressors of a life threatening situation while not understanding the implications of palliative care and therefore, not utilizing appropriate end-of-life care services.

While palliative care consults and admissions to a dedicated palliative care unit do not necessarily precede death, many hospital patients who are guided by palliative care are close to end-of-life. Some die in hospital, some die in hospice care, and some thrive after receiving a more holistic approach to health care than the monistic event-related acute care approach to patient needs.

The notion of the 'inverse care law' (Hart, 1971) describes how the observation that appropriate medical care tends to vary inversely with the people who have the greatest apparent need. Over 40 percent of the US population dies in a hospital setting (National Vital Statistics Reports, 2011) each year. The creation of dedicated palliative care units in the early 2000's and the subsequent development of a palliative care team to offer hospital wide consultations, was in part to address equitable access to palliative care for those most in need, who otherwise might be triaged because of clinicians perceived inability to provide successful outcomes. Often patients who are dying in the hospital have complex medical needs. They are experiencing the distress that accompanies dying. This is especially difficult for dying patients who do not have family or someone to be an advocate for appropriate care. A model of patient predictors for utilization of palliative care services will assist with the equitable access to this care.

Review of Theory and Research Question

This study's research question is: What are the predictors of access to palliative care within a large urban public teaching hospital? Both decedents who received a palliative care consult and decedents who were admitted to the palliative care unit were of interest. The conceptual framework of the Andersen Behavioral Model (Andersen & Davidson, 2007) was used in this study to help explain health care utilization of palliative care. Andersen (1995) suggested that three distinct types of characteristics of patients are very important when studying access to care.

Predisposing characteristics represent biological imperatives and the social structure. Enabling community resources, the health personnel and facilities, and personal resources, including the wherewithal to access healthcare, must be present. Finally need, both perceived need to help understand care-seeking and adherence, and evaluated need, the kind and amount of treatment required after diagnosis, are determinants of use. Although the population of this study is decedents, it is the journey to death, not the final outcome that is being addressed. The purpose of the model is to discover patterns of utilization and underutilization so that a more equitable access can be achieved.

Aday and colleagues (1993) included health status outcomes in the Behavioral Model in order to address issues for health policy and healthcare organization planning. Effective access is included to provide measures of consumer satisfaction with services because of improved health status and efficient access is shown when the level of health status or satisfaction increases relative to an increase in health care services consumed. With palliative care, satisfaction levels can be thought of as improving the quality of life for the critically ill. Caregivers and family members serve as a proxy for measuring improved health status, as often times the patient dies. Improved health status for a dying patient can be measured as addressing symptoms, goals of care and providing psychosocial and spiritual support. It is the value of these services as seen by the proxy that drives increased consumer satisfaction. Both effective and efficient access are particularly important in this study as specialized palliative care services may be considered an access-oriented intervention intended to alter the patterns of usage. It is the proxy for the palliative care services that will increase demand for specialized palliative care services.

Study Summary

The approach of this research was to examine determinants of access to palliative care services for decedents who die in the hospital. The conceptual model measured potential predictors of access to a palliative care consult and admission to a palliative care unit. The intent was to explore characteristics of those who receive consults and those who are admitted to a palliative care unit versus those who are not.

Direct logistic regression was performed to investigate the impact of a number of factors on the likelihood that a decedent would: 1): receive a palliative care consult, 20 or be admitted to a palliative care unit. The two models contain eleven independent variables representing potential determinants of access to a palliative care program. This includes predisposing characteristics (age, sex, race), and enabling resources (insured versus uninsured). The evaluated need variables include: 1) cancer diagnosis (a) primary and (b) anywhere in the diagnosis, each with three categories; solid, hematologic, and no cancer; 2) Referral (a) oncology vs. others, and (b) medicine, surgery and emergency care.

Study Findings

Predisposing Characteristics

The study design allowed for a comparison of determinants for decedents who received a palliative care consult with decedents who were admitted to a palliative care unit. Ahmen, et al. (2004) found evidence to suggest that decedents over 65 years of age are less likely to be referred to palliative care services. The results of this study (Table 41) suggest otherwise for both consults and admissions. This was most evident when comparing the decedents younger than 55 and those 85 years and older. For palliative care consults, younger cohort of decedents received palliative care consults at half the rate of the oldest old decedents. Admission to the palliative care unit followed a similar pattern.

Table 41

Two Models of Potential Determinants Logistic Regression Results

	Consult			Admission		
		Direction	*OR*		Direction	*OR*
Predisposing Characteristics						
Age 65 to 84 vs. Younger	Yes	65 to 84 more likely	1.2	Yes	65 + more likely	1.5
Age 85 vs.64 & Younger	Yes	85 + more likely	2.0			
Male	No			Yes	Males less likely	.88
Af. Am. & Other	Yes	Minorities Less likely	.84	No		
Enabling Resources						
Insured	Yes	Insured more likely	1.6	Yes	Insured more likely	1.3
Evaluated Need						
Cancer Anywhere (vs no)						
Solid	Yes	Solid more likely	2.1	Yes	Solid more likely	4.9
Hematologic Malignancy	No			Yes	Hematologic more	1.4
Oncology vs. other	No			Yes	Oncology more	1.2
Modifying Variables						
Medicine vs. ER	Yes	Medicine more likely	1.8	No		
Surgery vs. ER	No			Yes	Surgery less likely	.56

When comparing the oldest old to younger groups of older persons, cohorts 55 to 64, and 65 to 84, a similar pattern was found. These two younger old cohorts received palliative care consults and admissions at about the same rate. This rate was significantly less than the rate at which the oldest old decedents (85+) received both consults and admissions. This is in opposition to Burge et al. (2008) who found that the oldest old are less likely to use specialized palliative care services. The results of the models of potential determinants suggest that decedents 65 and over are more likely to receive a palliative consult and be admitted to the palliative care unit.

Many studies have suggested that most patients receiving palliative care services are in early old age, 66 to 73 years (Walshe et al., 2009). However, when the 85+ decedents were compared to the 65 to 84 decedents, those 85+ were less likely to receive a palliative care consult. This finding suggests that the palliative care team is addressing age disparities and is effectively referring the oldest old to the palliative care unit. Age was determined to be a predictor of palliative care consult in the palliative care consult logistic regression model controlling for other factors. Decedents 65 and over are 1.36 times more likely to receive a palliative care consult than decedents under 65.

Several studies have suggested that females are more likely to access palliative care (Burge et al., 2005; Solloway et al., 2005), and one study suggested that only females under 65 are more likely to utilize specialized palliative care services (Burge et al., 2008). Results from this study similarly suggest that when palliative care unit admissions and all age groups of decedents are taken into account, female decedents are more likely to utilize palliative care services. When comparing the two older groups of decedents, 65 to 84 with 85 and older, the relationship between these variables was statistically not statistically significant (p > .05). Male decedents had a slightly higher percentage within gender groups for both consults and admissions. However the relation between these variables was not statistically significant (*p* > .05).

Some studies have suggested the gender of the caregiver (Walshe et al., 2009) may have more impact on accessing palliative care than the gender of the patient. A younger caregiver is more likely to request home hospice, while an older caregiver may not have the wherewithal to support a spouse with complex medical needs. The one gender related study finding that women from all age groups are more likely to be admitted to the palliative care unit may be explained through caregiver literature that suggests that female spouses are predictive of home hospice care because of the support required to facilitate home hospice. In this context, younger home based hospice patients would be males. While younger hospital-based palliative care patients would more likely be females.

Barnato et al. (2009) found that African Americans, Hispanics, and other minorities are less likely to utilize specialized palliative services care than White non-Hispanics. Minorities with advanced cancer are more likely to be hospitalized for prolonged periods, and die in the hospital (Smith, et al., 2009). In this study, while decedents coded as African Americans and others were as likely to be admitted to the palliative care unit, African Americans and others were less likely to receive a palliative care consult. Decedents from culturally diverse backgrounds were equally likely to be admitted to the palliative care unit as White non-Hispanic decedents. However, they were less likely to receive a palliative care consult than White non-Hispanic decedents. Minorities are receptive to holistic palliative care but barriers persist, including lack of awareness, prohibitive costs, and mistrust of the system (Born, et al., 2004).

While palliative care admissions are driven by the needs of patients with fewer resources and more complex family dynamics, consults are driven by patient advocacy. These results help illuminate the cultural bias against less aggressive care and suggest a greater need for cultural competence among patients, as well as providers. Improving access to community resources and providing health literacy supportive of palliative and end-of-life care for minority populations should increase overall palliative care consults.

Enabling Resources

Studies investigating the uninsured as a socioeconomic characteristic when investigating access to palliative care have found that minority patients are twice as likely to be uninsured (Krakauer, Crenner, Fox & Barriers, 2002), and are more likely to be treated at late stages and to die from cancer (Ward et al., 2004). Further, uninsured patients are less able to take advantage of formal support and are more likely to drop out of a palliative care program (Francoeur, Payne, Ravels & Shim, 2006).

This study used insurance as a proxy variable for enabling resources in the theoretical model. Insurance was found to be a strong predictor of access to palliative care in both logistic regression models. Decedents with insurance were 1.6 times more likely to receive a palliative care consult, and 1.3 times more likely to be admitted to the palliative care unit than uninsured. Similarly, chi-square tests of independence found the relationship between insured and uninsured were statistically significant for both consult and admission. Addressing this disparity may better allow low income families the chance to balance presence for their dying kin while continuing to make a living.

Evaluated Need

One finding from the logistic regression model analyzing palliative care consults indicated that while solid cancer as a primary diagnosis is not a predictor of a palliative care consult, solid cancer as secondary diagnosis is a predictor of access to the consult. Results of the logistic regression model examining palliative care admission shows that solid cancers, both as primary and secondary diagnosis are strong predictors of admission. However, hematologic malignancy as a primary diagnosis is not a predictor for either consult or admission. Referral from oncology or medicine were not shown to be predictors of a palliative care consult, but referral from surgery was much less likely than referral from the emergency medicine. Oncologists were more likely to admit than other physicians to the palliative care unit. Medicine was nonconclusive, while an admission from the emergency medicine was more likely than admissions from surgery.

Implications and Suggestions for Future Research

This exploratory, non-experimental retrospective analysis was undertaken to determine predictors to accessing palliative care in a large urban public teaching hospital. Palliative care has experienced rapid growth in hospital settings in recent years (Goldsmith et al., 2008). Replicating similar decedent studies in other hospital settings, rural, or non-teaching hospitals with other types of palliative care services, would help further the knowledge, and increase awareness of barriers to appropriate end-of-life care.

A recent meta-analysis of studies reporting on medical end-of-life decisions by social groups (Rietjens, Deschepper, Pasman, & Luc, 2012) found that age and gender studies far outnumber ethnicity, marital status and socioeconomic studies on decisions at end-of-life. One major finding of this study was that minority decedents are as likely to be admitted to dedicated palliative care unit as White non-Hispanic decedents. However minority decedents are less likely to receive a palliative care consult. Johnson et al.(2008) and Smith et al, (2009) suggest a cultural bias against more aggressive care at end of life. For minority patients. The results of this study suggests further research into this disparity is warranted

Targeting research on developing effective protocol to improve outcomes associated with patient advocacy both from a provider perspective, and from a patient centered perspective, will address the inequity of health and social needs at end-of-life. Developing and promoting educational programming that improves health literacy and cultural sensitivity can better address inequities of access to palliative care.

Future research on the relationship between consult and admission to the palliative care unit would provide insights into improved transitions at end-of-life. This study highlighted differences in consult and admission. Initial statistics showed that 801 of the 1,312 decedents who received palliative care consults were eventually admitted to the palliative care unit. Consult is much more than a predictor of admission, in many cases it is a precursor. An in-depth analysis of the differences of decedents who received palliative care consults and were or were not admitted to the palliative care unit would serve to further improve transitions in end-of-life care.

Palliative care consults for patients who were later transferred to hospice were not included in the study population. Future research could follow the trajectories of patients who receive a palliative care consult and are discharged to home or hospice. By analyzing the demographics and socioeconomic status of decedents who choose home hospice versus decedents who remain in the hospital could provide incentives for targeted hospice care education.

The finding that the oldest old are more likely to receive a palliative care consult and as likely to be admitted to the palliative care unit in a large urban public teaching hospital is important in that the palliative care team also teaches clinical practice. A retrospective end-of-life survey of surviving family members (Addington-Hall, Altmann & McCarthy, 1998) suggested that the oldest old are considered less troubled by cancer, are more accepting of death, require less symptom control, psychological and spiritual support than palliative care provides. Perhaps this is the result of the gradual infusion of community based hospice care. It is important for hospital clinicians to treat the oldest old as individuals, without making age biased presumptions. Or else, they will experience dying in a hospital setting, sometimes with distressing symptoms, are then confronted with a health provider referral bias. This would lead to more aggressive care, which may not be appropriate care.

Wachterman and Sommers (2006) suggest that gender and marriage have not received significant attention in studies concerned with end-of-life outcomes. These variables are typically viewed as covariates and the direct effect of either variable receives significant attention. The authors conclude that marital status is the “key mediator of gender differences in end-of-life care. This is in part because married decedents are more likely to die in the hospital or at home and less likely to die in nursing homes than widowed, divorced or never married decedents (Solloway et al., 2005). Marital status was not statistically significant or served as a predictor in this study. There was very little variation between married decedents and decedents categorized as not married. This could in part be due to the evolution of the non-traditional formal caregiver. A more detailed comparison between married (38.2%) single (29.2%) widowed (13.3%) and divorced and separated (10.3%) may reveal insights into marital and gender differences for decedents and carers.

The results of this study suggest that insurance is a potential predictor of both palliative care consults and palliative care unit admission. A post-hoc analysis of decedent with commercial insurance compared to Medicaid and no insurance (Appendix 3) found that Medicaid was a strong predictor of both consult (17.9%) and admission (32.1%). Surprisingly, decedents with commercial insurance were less likely than decedents with Medicaid to receive a palliative care consult (13.0%) or to be admitted to a palliative care unit (23.1%). Further, decedents with no insurance were the least likely to receive a consult (7.7%) or be admitted to a palliative care unit (16.4%). A more detailed analysis of health insurance status of decedents and specialized palliative care services would further the understanding of the importance of this personal enabling resource.

Insurance may increase its importance in the determinants of access model even if the Affordable Health Care Act of 2010 is fully implemented. By requiring health insurance for some and providing a potentially more affordable health care exchange demand for palliative care services may increase. Medicaid would become more readily available if the Affordable Care Act is implemented. Uninsured and underinsured patients experiencing the high cost of end-of-life care are often unable to pay for medications to manage symptoms and pain (Francoeur et al., 2006). This leads to emergency indigent care because of the need for emergency medication management to address symptoms. If the Affordable Care Act does not address proper medication for pain management, and other complex palliative care issues for the underinsured because it stimulates low reimbursement insurance, then this attempt to provide more equitable access to healthcare may hinder access to appropriate pain management at end-of-life.

Hospitals and clinicians will be required to reduce costs by implementing strategies that promote cost-effective care. Donley and Danis (2011) argue that clinicians should offer discuss end-of-life care costs and finances with patients and families, and whether this should be included in treatment discussions. An open discussion on a good dying experience may better address patient autonomy and the high societal costs of aggressive end-of-life care.

Limitations

When researching seriously ill populations at end-of-life, it is extremely difficult to develop protocol for randomized control trials (Carslon & Morrison, 2008). This was a non-experimental observational study. Methodological issues for studies that rely on observational research include selection bias and confounding. The selection criterion was death. Selection bias occurs with referral for consult or admission to a palliative care unit. The patients have similar symptoms and needs. This may lead to confounding, which occurs when the variables that predispose selection are directly related to the outcome. Regression models control for confounding by estimating the value of each variable to the outcome.

This study method adopted direct (nested) binomial regression analysis rather than stepwise procedures which helps for independent variable screening and hypothesis generating (Tabachnick & Fidell, 2001). When the weighted palliative care unit days, reflecting the length of stay, is entered into the model, most of the independent variables are “bumped out” as the authors predicted. The palliative care unit stay variable alone showed overall correct percentages of 98.0% in the classification table.

History was also an internal threat to the validity of this study. The form used (Appendix 2) for consult has not been consistent between June 2006 and August 2011. Electronic forms have only been available for two years, and although most of the information was collected from the initial implementation, records do not exist of the original forms. The understanding and acceptance of palliative care may have changed over this time frame. The palliative care team has made efforts educate other units so that palliative care becomes more accepted and accessible.

This study focused on patients who were admitted to a hospital-based palliative care unit in a large urban public teaching hospital environment This focus limits generalizability to the types of palliative care services offered by a teaching hospital, which include a dedicated palliative care unit and a palliative care consult. The decedent population is unique in its large proportion of African American decedents, overwhelmingly the largest of the minority populations. The findings are limited in generalizability to this ethnic mix. Future research should focus on specialized palliative care offered in a variety of different types of hospitals

Insurance was used as the only predictor of enabling resources. Health insurance access is difficult to measure (Kottke & Isham, 2010) in part because less than adequate insurance also serves as a barrier to health care utilization. Measuring underinsured through poor private and public insurance was not addressed in this study. Age too is an issue in the study as there is probable correlation with younger decedents not having insurance because almost everyone over 65 would have either Medicare or Medicaid or private insurance. A follow-up study could analyze the Medicaid/uninsured decedents versus all other decedents

The dedicated palliative care unit that was the data source for this study is an eleven bed unit with a high occupancy rate (Cassel, Kerr, Pantilat, & Smith, 2010), often unable to admit dying patients. With the increased familiarity and acceptance of palliative care, demand should increase. The size of the unit has not changed since the unit opened. Dying patients needs have not changed. It is possible that patients who are turned away from a bed in the palliative care unit are random in nature with a first in need waiting list. However, the palliative care team could unintentionally choose from waiting lists for admissions by demographics, socioeconomic status, or referral from a familiar attending physician if the unit is already full.

Referrals for a palliative care consult are for many different patient needs. In this study there were over 300 different variations of referrals for pain, symptoms and goals.

Invariably, some of the referrals are specifically for pain resulting from trauma care, a car accident for example. Sometimes this patient dies in the hospital and would be included in a data set of decedents. This trauma patient would not ordinarily require palliative care, as once the injury is appropriately addressed, and the pain is under control, the patient is not likely to require palliative care to address end-of-life care needs. Therefore, the data on decedents who received a palliative care consult includes this scenario. A review of the data addressed this issue and it was determined that the number of decedents who received a palliative care consult and followed this type of scenario would have minimal impact on the entire data set of decedents who received a palliative care consult.

Conclusion

This study explores factors important to accessing palliative care consults and admission to a palliative care unit. The data set allowed for a comparison and contrast of two programmatic approaches to palliative care provision, a hospital wide consult program and a dedicated palliative care unit. Predictors of access to both palliative care consults and palliative care unit admissions for decedents follow the framework of the model. In respect to palliative care consults, older, White non-Hispanics with insurance are more likely to access a consult. Patients with hematologic malignancies are less likely to access a consult than decedents with solid cancers. Older adult women with insurance and a solid cancer are more likely to be admitted to a palliative care unit. Patients are more likely to be referred by oncologists and less likely to be referred by other physicians.

The Andersen model explains a small, but important aspect of the complex dynamics of accessing palliative care. In order to improve access to specialized palliative care services, these services must be monitored and evaluated. The variables available captured some of the aspects of health care utilization provided in the model. While demographic and socioeconomic variables have low mutability, as gender, age and ethnicity cannot be changed to increase utilization, other variables such as enabling characteristics and health beliefs are more mutable. Access should increase as the satisfaction of services improves (Aday et al., 2004). In this model access will also increase through educational programs that address perceived need and the imposition of clinical guidelines that address evaluated need.

The Andersen model also addresses the policy dimensions of access including addressing equitable (and inequitable) access according to determinants of access including age, gender, marital status, insurance status, and evaluated need. Other policy dimensions addressed by the Andersen model include effective and efficient access, by examining the relative impact of health service utilization within the context of predisposing, enabling, and evaluated need behaviors. Efficient access can be measured by the cost effectiveness of implement specialized palliative care services. By addressing equality, effectiveness and efficiency within specialized palliative care services, the Andersen model succeeds in framing future directions palliative care research.

In light of the issues that this study touched on, future research should be conducted on transitions from a palliative care consult, whether to home hospice or palliative care. Other research should address the changing structure of health care insurance, whether the Affordable Health Care Act of 2010 is fully implemented or not. The issue of consult versus admission should be addressed. Finally the disparity in African Americans and others propensity to be admitted to a palliative care unit but not receive a palliative care consult warrants future research.

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Appendix 1: Original Variables in Data Set

	Variable	Type	Len	Label
1	MRN	Char	12	Medical record number
2	AgeAtVis	Num	8	Age at visits
3	AcctNum	Char	12	Account number
4	PtType	Char	6	Patient type
5	PtType_Grp	Char	1	Patient type group
6	ICUDays	Num	8	ICUDays
7	PCUDays	Num	8	PCUDays
8	IPDays	Num	8	IPDays
9	Primary_dx	Char	6	Primary ICD9 Diagnosis code
10	PayPrim_Grp	Char	75	Health insurance status (based on primary payor for the admission)
11	AdmitMDDivis	Char	50	Admitting attending physician division
12	DispCode	Char	3	Discharge code (death=20)
13	LastUnit	Char	5	Last nursing unit
14	adm_date	Num	8	Admission date
15	dis_date	Num	8	Discharge date
16	recal_los	Num	8	Length of stay for the admission
17	age_grp	Num	8	Age group (1=18-54 years old, 2=55-64 years old, 3=65-79 years old, 4=80+ years old)
18	gender	Char	6	Gender
19	ethnicity_code	Num	8	Numeric value of the Ethnicity
20	Ethnicity	Char	40	Ethnicity description
21	Race	Num	8	Numeric value of Race category
22	Race_Desc	Char	30	Race category Desccription
23	zip_code	Char	10	Zip Codes
24	Marital_Code	Num	8	Numeric value of marital status
25	Marital_Status_Desc	Char	12	Marital Status Description
26	primary_cancer	Char	70	Cancer site grouping based on primary ICD9 code
27	trauma_flag	Num	8	trauma_flag=1 having trauma ICD9 code anywhere among diagnosis codes
28	cancer_anydx	Char	10	Cancer / no cancer anywhere among diagnosis codes
29	consult_date	Num	8	PCU consult date
30	Consult_or_Transfer	Char	100	Consult or Transfer
31	Unit_Prior_to_PC_Transfer	Char	100	Unit Prior to PC Transfer
32	Reason_for_Initial_PC_Consult	Char	510	Reason for Initial PC Consult
33	pain_among	Num	8	Consult reason (pain_among)
34	pain_only	Num	8	Consult reason (pain_only)
35	symptoms_among	Num	8	Consult reason (symptoms_among)
36	symptoms_only	Num	8	Consult reason (symptoms_only)
37	goals_among	Num	8	Consult reason (goals_among)
38	goals_only	Num	8	Consult reason (goals_only)

Appendix 2: PCLC Clinical Instrument

PCLC Clinical Instrument - *__Initial__* Assessment

Patient Name:______________________
Last

MRN #: _____________________ PLEASE BE SURE TO WRITE THIS CLEARLY AND CORRECTLY

Date of __Initial__ PC Consult: ____/____/____

Provider completing initial consult: Attending MD   Fellow   Resident   APN   (circle all involved)

Type of PC Involvement:

☐ *One-time consult only*
☐ *Consult w/ follow-up*
☐ *Direct Admit to Inpatient PC Unit*
☐ *Transfer   to inpatient unit* from another hospital unit

Reason for Initial PC Consult

☐ Pain
☐ Other symptoms
☐ Advance Care Planning
☐ Goals of Care Discussion
☐ Hospice Referral/Discussion
☐ Withdrawal of Aggressive/Artificial Life Prolonging Interventions
☐ Transfer to Inpatient Unit
☐ Other:____________________

Unit/Clinic at Time of Consult

☐ Outpatient clinic
☐ ER
☐ ICU
☐ Med/Surg

If admission or transfer to PCU is delayed, indicate # of days delayed: ________

And reason for delay: ____

m-ESAS SYMPTOMS: To be rated as 0=none; 1=mild; 2=moderate; 3=severe; NA=not applicable

- Pain (0-10): avg_____
- Tiredness_________
- Nausea ___________
- Depression ________
- Anxiety ___________
- Drowsiness ________
- Anorexia ______
- Constipation_____
- Shortness of breath/Dyspnea_____
- Secretions ______
- Unable to respond: Yes___No___
- *Delirium*: Yes ____ No___

APPENDIX 3 Commercial Insurance, Medicaid and No Insurance

Percentage of Decedents with Commercial Insurance, Medicaid, and No Insurance who Received a Palliative Care Consult Compared to Decedents who Did Not Receive a Palliative Care Consult

Insurance	Consult – No	Consult – Yes	Total
Commercial Insurance	1,646 (87.0%)	245 (13.0%)	1,891
Medicaid	896 (82.1%)	195 (17.9%)	1,091
No Insurance	934 (92.3%)	78 (7.7%)	1,012

n = 3,994 $\chi^2(2) = 48.070$, $p < .001$,

Percentage of Decedents with Commercial Insurance, Medicaid, and No Insurance who were Admitted to a Palliative Care Unit Compared to Decedents who were not Admitted to a Palliative Care Unit

Insurance	Admission – No	Admission – Yes	Total
Commercial Insurance	1,454 (76.9%)	437 (23.1%)	1,891
Medicaid	741 (67.9%)	350 (32.1%)	1,091
No Insurance	846 (83.6%)	166 16.4%)	1,012

n = 3,994 $\chi^2(2) = 72.143$, $p < .001$,

VITA

Leland Hubert Waters III was born on February 1, 1960 to Leland and Mary Glass Waters in Atlanta, Georgia. Mr. Waters is a citizen of the United States. He Graduated from Open High School, Richmond, Virginia, in 1978. He received his Bachelor of Science in Economics from Virginia Commonwealth University in 1987 and a Master of Gerontology from Virginia Commonwealth University in 2002. Mr. Waters has been employed at the Virginia Center on Aging at Virginia Commonwealth University since August 2000. He currently serves as Assistant Director of the Virginia Geriatric Education Center and administers the Geriatric Training and Education Initiative, a statewide workforce development award. His research interests include palliative and end-of-life care, geriatric workforce development, and culture change in long-term-care.