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An Examination of the Influence of Socioeconomic Status and Race on End-of-Life Treatment Level Following a Palliative Intervention

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AN EXAMINATION OF THE INFLUENCE OF SOCIOECONOMIC STATUS AND RACE ON END-OF-LIFE TREATMENT LEVEL FOLLOWING A PALLIATIVE INTERVENTION

by

KATHLEEN BENTON

(Under the Direction of James Stephens)

ABSTRACT

The purpose of this study was to examine differences in treatment level at the end of life according to race and socioeconomic status and the extent a palliative intervention may change the course and cost of care. The study population included patients from the Medical Center of Central Georgia (N=2,920). The data were examined as a secondary analysis retrospectively. Data from the medical record and a unique clinical database were coded into descriptive, predictor, and outcome variables to define the population, and the patient’s treatment status before and after the intervention. McNemar’s test of symmetry, Chi Square, and Logistic Regression models were used to examine relationships between predictor and outcome variables including race, gender, age, disease, income, and education levels affecting code status, comfort status and discharge to hospice. Costs pre- and post-intervention were also examined using the t-test. Results demonstrated that the palliative intervention had a significant effect on costs and care level. Further, African Americans with lower levels of education were more likely to choose aggressive measures than Caucasians. Findings may improve understanding of the palliative intervention and encourage culturally competent end-of-life education.

INDEX WORDS: Socioeconomic status, Race, End of life care, Palliative care, Code status, Comfort measures
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by

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Gerald Ledlow
Richard Ackermann

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DEDICATION

This dissertation is dedicated to all those who suffer with an incurable illness.

More personally, to my brother Daniel who has suffered more than any one human should have to experience. It is through his strength and vivacity that I am forever inspired to help others achieve dignity, peace and individual quality of life.
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# TABLE OF CONTENTS

ACKNOWLEDGMENTS ............................................................................................................. vi

LIST OF TABLES .................................................................................................................... ix

LIST OF FIGURES .................................................................................................................. xii

CHAPTER

1 INTRODUCTION .................................................................................................................... 1

- Background ......................................................................................................................... 1
- Purpose of the Study .......................................................................................................... 3
- Significance of the Study ................................................................................................... 4
- Definition of Terms ............................................................................................................. 6
- Literature Review .............................................................................................................. 9

  - Palliative Care .................................................................................................................. 10
  - Palliative Care Models ................................................................................................. 15
  - Hospice versus Palliative Care ..................................................................................... 18
  - Socioeconomic Status and Race on End-of-Life Decision Making ......................... 22
  - Code status and Comfort Level Care Issues .............................................................. 27
  - Costs at End of Life ....................................................................................................... 34
  - Summary ......................................................................................................................... 37

2 RESEARCH QUESTIONS AND HYPOTHESES ............................................................. 40

  - Research Questions ...................................................................................................... 40
  - Hypotheses ..................................................................................................................... 43

3 METHODS .......................................................................................................................... 46

  - Purpose of the Study ..................................................................................................... 46
  - Design of the Study ....................................................................................................... 46
Sampling Plan .....................................................................................................48
Instrumentation ...................................................................................................48
Collection and Treatment of the Data .................................................................49
Analysis and Interpretation of the Data ...............................................................51

4 RESULTS .......................................................................................................................52
Sample Characteristics ........................................................................................52
Geocoding to Define Socioeconomic Status .......................................................56
Analysis of Research Questions and Hypotheses ................................................59
Systematic Sample ..............................................................................................92
Summary of Results ............................................................................................93

5 SUMMARY, DISCUSSION AND CONCLUSIONS ...............................................96
Summary of Findings .........................................................................................96
Conclusions ........................................................................................................99
Discussion of Findings ......................................................................................101
Study Strengths and Limitations .................................................................103
Implications for Public Health ..........................................................................105
Suggestions for Future Research ......................................................................106

REFERENCES ................................................................................................................108

APPENDICES

A IRB APPROVAL LETTER .................................................................................123
B PROJECT TIMELINE .........................................................................................124
C SECONDARY DATA AGREEMENT ................................................................125
## LIST OF TABLES

Table 4.1: Sample Patient Characteristics .................................................................54
Table 4.2: Sample Outcome Variables ........................................................................56
Table 4.3: Total Code Status Change Following the Intervention.............................60
Table 4.4: Code Status Change According to Gender- female .................................61
Table 4.5: Code Status Change According to Gender- male .......................................61
Table 4.6: Code Status Change According to Race- Black ........................................62
Table 4.7: Code Status Change According to Race- White ..........................................62
Table 4.8: Code Status Change According to Age - 18-65...........................................63
Table 4.9: Code Status Change According to Age - 66-plus......................................64
Table 4.10: Code Status Change According to Education- <high school ...............65
Table 4.11: Code Status Change According to Education- high school diploma ........65
Table 4.12: Code Status Change According to Education- college ..........................65
Table 4.13: Code Status Change According to Income- <$10,000 ............................66
Table 4.14: Code Status Change According to Income- $10,000-29,999 ....................67
Table 4.15: Code Status Change According to Income - $30,000-49,999 .................67
Table 4.16: Code Status Change According to Income- $50,000-74,999 ...................67
Table 4.17: Code Status Change According to Income- >$75,000 .............................67
Table 4.18: Code Status Change According to Payer Source- insured .......................68
Table 4.19: Code Status Change According to Payer Source- underinsured .............68
Table 4.20: Code Status Change According to Disease Distribution- cancer ..........69
Table 4.21: Code Status Change According to Disease Distribution- no cancer .......70
LIST OF TABLES

Table 4.22: Code Status Multivariate Analysis ................................................................70
Table 4.23: Aggressive/Comfort Measure Status Total.....................................................72
Table 4.24: Aggressive/Comfort Measure Status According to Gender- female ..............73
Table 4.25: Aggressive/Comfort Measure Status According to Gender- male ..............73
Table 4.26: Aggressive/Comfort Measure Status According to Race- Black .................74
Table 4.27: Aggressive/Comfort Measure Status According to Race- White ..............74
Table 4.28: Aggressive/Comfort Measure Status According to age- 18-65 .................75
Table 4.29: Aggressive/Comfort Measure Status According to age- 66+ .....................75
Table 4.30: Aggressive/Comfort Measure Status According to Education- <high school76
Table 4.31: Aggressive/Comfort Measure Status According to Education- high school ..76
Table 4.32: Aggressive/Comfort Measure Status According to Education- college……..77
Table 4.33: Aggressive/Comfort Measure Status According to Income- <$10,000……..78
Table 4.34: Aggressive/Comfort Measure Status According to Income-$10,000-29,999 78
Table 4.35: Aggressive/Comfort Measure Status According to Income-$30,000-49,999 78
Table 4.36: Aggressive/Comfort Measure Status According to Income-$50,000-74,999 79
Table 4.37: Aggressive/Comfort Measure Status According to Income- >75,000............79
Table 4.38: Aggressive/Comfort Measure Status According to Payer Source-insured.....80
Table 4.39: Aggressive/Comfort Measure Status According to Payer Source-underins...80
Table 4.40: Aggressive/Comfort Measure Status According to disease- cancer ..............81
Table 4.41: Aggressive/Comfort Measure Status According to disease-no cancer ..........81
LIST OF TABLES

Table 4.42: Aggressive/comfort measures status-multiple variables ........................................82
Table 4.43: Hospice discharge according to gender ..............................................................83
Table 4.44: Hospice discharge according to age .................................................................84
Table 4.45: Hospice discharge according to gender ..............................................................84
Table 4.46: Hospice discharge according to race .................................................................85
Table 4.47: Hospice discharge according to education .........................................................86
Table 4.48: Hospice discharge according to income ............................................................86
Table 4.49: Hospice discharge according to disease distribution .........................................87
Table 4.50: Length of stay .................................................................................................88
Table 4.51: Days saved according to age ............................................................................90
Table 4.52: Days saved according to disease .......................................................................91
Table 4.53: Days saved according to hospice ....................................................................92
Table 4.54: Cost Savings average pre and post intervention ..............................................93
LIST OF FIGURES

Figure 4.1: Geocoded Addresses .................................................................58
CHAPTER 1
INTRODUCTION

Background

The economics of death, including high healthcare costs at the end of life, are well documented (Zhang et al., 2009). However, no appropriate value for spending at the end of life is known. Historical trends for end-of-life spending document the particularly high costs associated with care in the last year of life (Emanuel & Emanuel, 1994; Luce & Rubenfield, 2002). According to Reynolds, Cooper, and McKneally (2005), many issues contribute to this dilemma. Glass and Nahapetyan (2008) believe that it is attributable to America’s “death denying culture” (p. 4). Others argue that because heightened technology has become so effective at extending life, it becomes more difficult to recognize what defines end of life (Reynolds et al., 2005). Though the United States medical system allows for continued aggressive care for the dying, disparities still exist in basic primary care; and in comparison with other countries, America still views mortality as a choice (Lown, 1998).

Fr. Thomas Nairn (2009) wrote that there are few professionals who are willing to provide comprehensive end-of-life guidance. The Patient Self Determination Act of 1991 increased the autonomy of the patient and proposed the use of advance care planning documents to motivate end-of-life discussions (Grimaldo, et al., 2001). Yet, many healthcare providers in America still have not reached the point where they are ready to lead these difficult discussions, at least not until they become forced to do so (Nairn, 2009).
In 2010, *The New Yorker* published a case study that centered on a young female patient who was diagnosed with lung cancer shortly before she delivered her first child. Her physician wrote about the final three months of this woman’s life, which included four rounds of chemotherapy and countless tests and hospital visits. Similar to other case studies on patients and their end of life (Srivasta, 2007), this woman’s life ended in a hospital bed against her wishes to die peacefully at home – a consequence of the medical world’s inability to ease her into the dying process (Gawande, 2010). For a patient with a fatal disease, the aggressive treatments and utilization of expensive resources at the end of life may include “three-thousand-dollar-a-day intensive care, five-thousand-dollar-an-hour surgery. But, ultimately death comes...” (Gawande, 2010, p. 3).

**Palliative care** includes interdisciplinary symptom management with the goal of improved quality of life through the use of clinical, emotional, psychosocial, and spiritual triggers (Griffin, Koch, Nelson, & Cooley, 2007). A variety of palliative models have been utilized and published (Babcock & Robinson, 2011; Crawford & Price, 2003; Curtis & Rubenfield, 2005; Nelson et al., 2010; Spugnardi, 2008). One aspect of the palliative discipline is the ability of the trained healthcare professional to engage in a meaningful discussion about patient feelings on quality of life and wishes for the end of life.

**Palliative care** is not Hospice. **Hospice** care is defined as end-of-life care exclusively, with no **aggressive measures** (National Hospice and Palliative Care Organization (NHPCO), 2009). **Palliative care** can include management of symptoms at the same time that the patient is receiving aggressive treatment for the underlying condition (Griffin et al., 2007).
Research documents consistent differences on end-of-life treatment preferences according to race, and more recently studies have included socioeconomic status as a predictor for these same decisions (Muni, Engelberg, Treece, Dotolo, & Curtis, 2011). African American patients are more likely to choose aggressive care at the end of life, even though their use of medical interventions at disease diagnosis is less common (Johnson et. al, 2010). Efforts to address potentially inappropriate and burdensome aggressive care decisions for all populations have been made through the work of the palliative care and hospice movements (e.g., Center to Advance Palliative Care (CAPC), 2009; NHPCO, 2009).

The literature includes an abundance of studies indicating that the use of a palliative intervention results in cost savings for the system, as well as quicker de-escalation, meaning a shift in care from high level aggressive measures like artificial supports and therapeutic medications to pain control and withdrawal of support (Appleby, 2006; Emanuel & Emanuel, 1994; Hansen, Usher, Spragens, & Bernard, 2008; Meier & Beresford, 2008; Zhang et al., 2009). De-escalation may include changes to care such as Do Not Resuscitate, or DNR orders, withdrawal of care decisions, and hospice discharges. Through the use of successful palliative care models, effective and appropriate comfort measures also lead to healthcare resource savings, while providing enhanced quality and support to patients and their families at a critical time (Meier & Beresford, 2008).

**Purpose of the Study**

The purpose of this study was to examine differences in treatment level at the end of life according to socioeconomic status and race. Data included treatment level...
measurements before and after the palliative intervention using a secondary data set. Length of stay costs aligned with treatment level was also examined relative to socioeconomic status and race.

The Transitions Palliative Care Model is a counseling-initiated palliative model used at the Medical Center of Central Georgia in Macon, (MCCG). This study used pre-existing retrospective quantitative data collected by the program to examine code status, care level shift to comfort measures only, hospice decisions, and costs associated with care level and length of stay before and after the palliative intervention.

**Significance of the Study**

This study adds to the literature in two distinct ways. First, while there is a growing body of literature on race and ethnic disparities in healthcare, few studies address racial disparities specific to the end of life (Bach, Cramer, Warren, & Begg, 1999; Barnato et al., 2006; Borum, Lynn, & Zhong, 2000; Degenholtz, Thomas, & Miller, 2003; Epstein & Ayanian, 2001; Muni et al.,). Second, few studies address socioeconomic status as a confounder to racial differences in care choice (Muni et al., 2011; Fiscella & Franks, 2001; Fowler et al., 2010; Franks & Fiscella, 2002; Muni, et al., 2011). This research addressed both areas of disparity in public health.

Two measures of effective public health practice include improved quality of life and more efficient allocation of resources (Teitelbaum & Wilensky, 2009). Healthcare spending constitutes 17% of the Gross Domestic Product, and this is far greater than any other expenditure in the US, including national defense (Finkler, 2005). President Barack Obama initially pledged $675 billion towards healthcare reform in 2009. This figure remains ever-increasing. President Obama has asked hospitals, physicians and
administrators to stand by their pledge to be more efficient with healthcare dollars in their medical practices (Inglehart, 2009). The significance of end-of-life care on healthcare costs is evident throughout the literature (Appleby, 2006; Emanuel & Emanuel, 1994; Hansen, et al., 2008; Meier & Beresford, 2008; Zhang et al., 2009).

Healthcare resources spent at the end of life are well documented, with care in the last week of life accounting for higher costs and poorer quality end-of-life experience when end-of-life discussions have not taken place (Zhang et al, 2009). When end-of-life discussions do not occur, futile aggressive care continues and a prolonged death with poor quality and high costs may result (Glass & Nahapetyan, 2008). Participant physicians in one study asserted that this type of conversation is not in their training, and that the importance of their role is curing and healing, not discussing “unimportant” side effects (Hordern & Street, 2007). However, beyond the quality of subsequent death is the concern for what quality of life will accompany the progression of a disease. A Palliative care team has been proven to be more effective than other professionals in healthcare at leading discussions about quality of life and end-of-life care options (Fineberg, 2005).

After all information is shared and communication barriers are addressed, patients and families may continue to choose artificial support. Some patient values may align with this quality of end of life. However, the success of the intervention is the ability to inform and educate (Babcock & Robinson, 2010).

Millions of people each year are diagnosed with terminal illness and may benefit from palliative measures to improve quality of life outcomes. Furthermore, issues of quality of life during illness are critical to overall public health practice (Adunsky, Aminoff, Bechor, Arad, & Bercovitch, 2008). Psychological and physiological distress,
produced by a patient’s inability to cope with the adverse events from disease and treatment, affects the magnitude of poor quality of life (Lethborg, Aranda, Cox & Kissane, 2007).

**Definition of Terms**

The following are terms used throughout this research and are relevant to the purpose and significance of the study. This section provides definitions to ensure that the reader is familiar with key terms used in this dissertation paper.

**Advance Directive.** Advance Directives allow a patient to have their wishes upheld at end of life when they cannot speak for themselves. They include both the living will and the durable power of attorney for healthcare (Tierny et al., 2001).

**Code Status.** For the purpose of this research, Code Status will reference the care status levels described below including DNR or Do Not Resuscitate, full code, and Status IV comfort measures.

**Consult.** A consult is defined for the purpose of this research as a referral made from one physician service to another program or service. It is a formal request to assess a patient.

**De-escalation of Care.** For the purpose of this research, De-escalation of Care is defined as any downward level treatment changes including Do Not Resuscitate, or DNR orders, withdrawal of care decisions, and hospice discharges.

**DNR.** DNR is the acronym for Do Not Resuscitate. This is an order written by a licensed physician and with consent from a patient or authorized party in reference to code status. The DNR code status, also Status II-Status IV at MCCG means there will be
no emergency treatment when a cardiac or respiratory arrest occurs. (Medical Center of Central Georgia, 2007).

End-of-life Care. End-of-life Care is defined in this paper as care for the terminally ill patient.

Full Code. Full Code is defined as no DNR order in place and all emergency treatment given in the event of a cardiac or respiratory arrest. Full code also means full resuscitation or CPR, cardio-pulmonary resuscitation. Resuscitation is a combination of medicines and machines utilized to re-start respirations and the heart (Medical Center of Central Georgia, 2007).

Hospice. Hospice care is defined as end-of-life care exclusively, with no aggressive measures aimed at curative results (NHPCO, 2009).

Length of Stay. Length of Stay (LOS) is another tool to determine resources saved. Decreasing LOS may include overall hospital stay or proof of decreasing stay in a medical intensive care unit (Norton et al., 2007).

MCCG. The Medical Center of Central Georgia, Macon, GA. For the purpose of this research MCCG will be used to reference the entity where data collection and treatment was conducted.

Palliative Care. Palliative care includes interdisciplinary symptom management with the goal of improved quality of life through the use of clinical, emotional, psychosocial, and spiritual triggers. This care is not mutually exclusive to aggressive measures (Griffin et al., 2007).

Palliative Care Model. Palliative Care Models are defined as those which include the interdisciplinary team of physician, nurse, social worker, spiritual counselor, volunteer
and pharmacist. This team works together to share “a philosophy of care and an organized, highly structured system…” (Crawford, 2011, p.13). For this research, a *palliative program* is interchangeable with *palliative model*.

Palliative Care Team. Palliative care is a multidisciplinary approach to the relief of symptoms and suffering and the improvement of overall quality of life during illness. The Palliative Care Team is made up of all disciplines involved in this goal. Palliative care team consultation includes a discussion surrounding long term goals of the patient/family including advance care planning and/or care at the end of life. The care team is patient and family centered (Griffin et al., 2007).

Race. Race will include Caucasian (White) and African American (Black) patients only. For the purpose of this research, race is determined based on scripted questions asked at registration for MCCG patients in which patients self report their personal racial association. Race is not under the auspices of ethnicity for this research.

Socioeconomic Status. Income and education will define a patient’s Socioeconomic Status (SES) based on the census tract that correlates with the patient’s address. For the purpose of this research, SES is determined by address using a geocoding method described in the methodology section of this paper.

Status One. For the purpose of this research, Status One is defined by MCCG as complete care, no restrictions. The patient will receive all necessary medical care including CPR, full code (Medical Center of Central Georgia, 2007). This is also referenced as *aggressive care* throughout this paper.
Status Two. For the purpose of this research, Status Two will not be included but is defined by MCCG as complete care, no CPR in cardiac/respiratory arrest (Medical Center of Central Georgia, 2007).

Status Three. For the purpose of this research, Status Three will not be included but is defined by MCCG as care and comfort plus other therapies agreed upon by authorized party and physician (Center for Palliative care, MCCG, Resuscitation Policy, 2007).

Status Four. For the purpose of this research, Status Four is defined by MCCG as no CPR, care and comfort only. This paper will also define the care as comfort measures only (Center for Palliative Care MCCG, Resuscitation Policy, 2007).

**Literature Review**

In 2007, *The New England Journal of Medicine* published a case study which explained some of the issues surrounding end-of-life care decisions. The patient was a young married man with three small children. When his cough started, his doctors did not think the case was serious, and thus he was prescribed a series of antibiotics (Srivastava, 2007).

It was not until lab work showed an iron deficiency that the physicians confirmed a terminal diagnosis and doctors prescribed aggressive care. The patient’s wife focused on each life-prolonging treatment measure, while the patient slowly realized his own demise was imminent (Srivastava, 2007).

Each new round of physicians offered options, all of which excluded the reality of the patient’s impending death. Though the diagnosis was clearly terminal, the patient was never discharged from the hospital nor offered choices of symptom management or end-of-life care. Instead, the healthcare specialists kept him in the hospital for additional
tests. On the day before he died, an order was written for a liver biopsy. Specialists planned to investigate his liver failure instead of addressing the end of his life – then suddenly, it was over. Everyone, including the experts, seemed shocked – they never let him know; they never let him go (Srivastava, 2007).

This study will investigate the end-of-life choices patients make at MCCG. Unlike the case presented above, this study’s patients will have had a palliative intervention prior to death. The purpose of this study is to examine if there are differences in treatment level at the end of life based on socioeconomic status and race. Data will include treatment level measurements before and after the palliative intervention. The Transitions model is a counseling-based palliative model used at MCCG. This study will utilize pre-existing retrospective quantitative data collected by this program to examine code status, withdrawal of care, and hospice decisions. Furthermore, the study will look at potential cost savings and length of stay following a palliative consult.

**Palliative Care**

There is some misunderstanding and lack of acceptance surrounding the palliative discipline in healthcare. Because death and end of life may be viewed as a “therapeutic failure” by physicians, the end-of-life stigma creates a barrier to the success of palliative programs (Baider & Wein, 2001, p. 98). Palliative care is a multidisciplinary approach to the relief of symptoms and suffering, and its goal is the improvement of overall quality of life during illness. Palliative care does not require that death be imminent, and such care may include aggressive treatment of the underlying diseases as well as pain and symptom management. Palliative care is patient- and family-centered, and it includes discussions
surrounding the patient’s long term goals, including advance care planning and/or care at
the end of life (Griffin et al., 2007).

Palliative programs have been developed to meet the pain and symptom
management needs of the populations with disease, and to help families and patients
understand their therapeutic options (Gade et al., 2008). Palliative care as a discipline is
relatively new. A significant SUPPORT study on communication at end of life took place
prior to the palliative movement, and the study’s failure highlights the need for the
palliative discipline (Knaus et al., 1995).

The SUPPORT phase I prospective observational study and phase II randomized
control trial was conducted in the early 1990s with a goal of improving communication in
end-of-life care and reducing deaths on life-sustaining support. Five well-accredited
academic hospitals participated over a two-year time period. Participants included 9,105
adults hospitalized with a life-threatening disease (Knaus et al., 1995). In the phase I
portion of the study, poor communication was observed to highlight the breakdown in
care goals between the physician and patient at the end of life. In the phase II
intervention, communication was enhanced and information was heightened to physicians
and patients through the work of trained SUPPORT nurses. Results from the study
yielded no improvement in communication breakdown or decrease in prolonged deaths
through the use of life-sustaining therapies. The study authors speculated that the failure
of the intervention proved the ongoing need for consistent interventions to discuss
advance care planning and goals of care. Without name, it highlighted the need for
palliative care in hospitals. This study holds historical significance as credible research
evidencing the need for palliative care interventions (Knaus, 1995).
There are now numerous studies on the positive effects of palliative care (Edens, Harvey, & Gilden, 2010; Gade et al., 2008; Temel et al., 2010). A recent randomized control trial compared patients with non-small-cell lung cancer who received palliative care with those who did not (Temel et al., 2010). Both groups received state-of-the-art cancer treatment at a major research center. Participants included 151 randomly assigned patients who received either standard oncological care or palliative care incorporated with standard oncological treatment. The palliative patients not only scored higher quality-of-life ratings, but also lived three months longer than those patients who only received aggressive measures. Overall, patients who received the early palliative intervention received less aggressive care measures and still had longer length of life. The study showed that early palliative care led to an increase in documented resuscitation preferences, a decrease in chemotherapy, and an increase hospice use. The study’s significant results showed lower costs yielded a longer life for these patients (Temel et al., 2010).

Palliative care is essentially quality-of-life care. It is not necessarily exclusive to end-of-life care, but it does impact and influence the type of care that is received at end of life. This sub-specialty of medicine embraces all psychological, physiological, and spiritual symptoms that may contribute to poor quality of life. For example, despite the variety in diagnoses, fatigue and pain remain some of the most debilitating symptoms of many illnesses (Kutner, Bryant, Beaty, & Fairclough, 2006). Quality-of-life studies have shown that these symptoms improve over time with palliation involvement. Because palliative care includes spiritual discussions and quality-of-life discussions, patients may
have the chance to define what constitutes individual quality of life and may be better able to define how to balance the risks and benefits of proposed interventions (Gade et al., 2008). Palliative care may improve quality of the dying experience and improve deaths that lack meaning, dignity, and overall comfort (Dunn, 2005).

Only a small percentage of cancer patients are routinely given information about life expectancy and alternative palliative treatments during diagnosis and treatment visits (Kim et al., 2008). If a patient with a terminal illness never receives a palliative consult, the goals for care may be set only around treatment, with no discussion of the inevitable finality. Many patients with terminal illness die without ever having a discussion about end of life (Temel et al., 2010). Palliative medicine is the hope for control of this problem. Improved communication, especially discussions on advance directives, and treatment preferences are key to the palliative process. These may lead to improve both quality and quantity of life (Griffin et al., 2007).

The Center to Advance Palliative Care (CAPC) is a centralized resource for hospitals and palliative programs that offers guidance and technical assistance. CAPC has developed best practices and has provided standardization to the discipline (Weissman & Meier, 2008). In addition to studying the variation and design of different palliative programs throughout the United States (Spugnardi, 2008), CAPC has also convened a panel to address barriers inhibiting palliative interventions, such as resource issues and referrals made late in the progression of illness. As a quality improvement initiative, this panel developed a set of checklists for hospitals and physicians to use at registration and at subsequent patient visits (Weissman & Meier, 2011).
In March 2010, CAPC notified hospitals that the quality accreditation agency known as The Joint Commission developed a palliative care certification. This highlights the importance of having a palliative program within hospital settings, as a measure of healthcare quality (Center for the Advancement of Palliative Care, 2010). Only recently has the Joint Commission designated palliative care as a “necessary intervention” (Edens et al., 2010, p. 379).

In 2003, 25% of hospitals had palliative care programs, and programs were found to be more prevalent in facilities with a higher number of beds (Morrison, Maroney-Galin Kravolec, & Meier, 2005). In a study examining the variability in prevalence of programs across the U.S., Georgia was ranked on the lower end of average, with only 20-40% of hospitals recorded as having programs, dependent upon the hospital status: community, public, not-for profit or for-profit status. This is below the current national average of 52.8% and compares with 100% in Vermont, and 80%-plus in the District of Columbia, New Hampshire, and Montana. Georgia does surpass states like Mississippi at 10% and Alabama at 16%. Variability was high across U.S. programs dependent upon the culture of the institution (Goldsmith, Dietrich, Qingling, & Morrison, 2008).

The National Palliative Care Registry created by the Center for the Advancement of Palliative Care conducted a review of hospital palliative care programs across the nation, through a self-reporting mechanism, for data obtained from 2008 (2009). 420 hospitals responded and 363 of those reported seeing patients through palliative consultation services. Recommendations for future palliative work included funding a dedicated director, establishing a data collection and reporting mechanism consistent with
infrastructure, ensuring the program is aligned with the institutional mission and ensuring palliative care was integrated into all relevant service lines (Weisman & Meier, 2008).

**Palliative Care Models**

Palliative care models include an interdisciplinary team of physician, nurse, social worker, spiritual counselor, volunteer and pharmacist. This team works together to share “a philosophy of care and an organized, highly structured system…” (Crawford, 2011, p.13). Currently, only three states in the U.S are cited as having a grade A rank on their reported number of palliative care programs (Spugnardi, 2008). These include Vermont, Montana, and New Hampshire. In a recent review by Babcock and Robinson (2010), most palliative programs follow a medical model with the advanced care practice nurse or physician as the key component (Gade et. al., 2008; Nelson et al., 2010; Santa-Emma, Roach, Gill, Spayde, & Taylor, 2002). An interdisciplinary approach is consistent throughout all models including, at a minimum, a pain management specialist, a psychosocial professional, a spiritual leader, and a practitioner. The central component of each program is improving quality of life (Babcock & Robinson, 2011).

Teamwork in decision making is “…an integral part of palliative care…” (Crawford & Price, 2003, p. 1). Just as an organization needs a mission and vision, so too does an effective palliative care team (Crawford & Price, 2003). The team shares the suffering with the patient, thereby removing some of the burden from the patient and family (Wakefield, 1999). The role of the palliative worker is to treat dying as a normal process and to treat a patient as a whole being instead of as an ailing organ. (Rokach, 2005).
The most common palliative model cited by Meier and Beresford (2007) is referred to as the consultation model. Similar to other services within the hospital community, the attending physician consults the palliative program to assess and confer with their patient. Typically, in other areas of the hospital, consultation is to one discipline, for example a specialist physician, a physical therapist or a social worker. A palliative consult is made to multiple disciplines at one time. The referring physician is the program’s client and continues to guide patient care (Meier & Beresford, 2007). Communication between the managing physician and the palliative consult service is a key part of addressing goals of care and symptom management (Meier & Beresford, 2007).

A less common model, the integrative approach, exists when palliative philosophies are woven throughout a clinical unit, often in an intensive care setting (Nelson et al., 2010). Though palliative care is often seen as targeting patients with cancer, all diseases can potentially benefit from the services (Curtis & Rubenfield, 2005). Physician organizations such as the American College of Chest Physicians support an interdisciplinary approach in their patients with severe or life-threatening pulmonary or cardiac diseases, when led by the attending physician (Selecky, Hall, Varkey & McCaffree, 2005).

Planning for a palliative model includes the involvement of key stakeholders- both clinicians and non-clinicians- for pre-program planning and education to explain how a palliative program can enhance a complex healthcare system. The palliative discipline often utilizes consult triggers, order sets for pain management, and explicit
policies for de-escalation of care, such as for the withdrawal of mechanical ventilation. Programs should develop evaluation systems to assess the effectiveness of the program and document the shift in quality measures post intervention (Radwany, et al., 2009). The continued goal is the prevention of unnecessary suffering (Priest et al., 2009).

One of the key components of a good model is the ability to motivate and efficiently see referrals. This means physicians must feel motivated to write for a palliative consult, and timely coordination of all palliative services must be available. A successful palliative program must be continuously marketed (Meier, 2005). Meier (2005) recommended that a program use physicians to champion the outreach to specialists, engage managing physicians on an individual level, mold to the facility’s culture, develop an easy consultation process, and maximize the ability to grow in consult volume. Once the consult has been initiated, one of the most important tools of the palliative intervention is the family conference. Variations in models include the target population, for example a pediatric model. Pediatric populations cite an ongoing issue with quality treatment for children with life-limiting illness, prompting similar interdisciplinary models, which may even include extended education to families and disciplines like art therapy (Browning & Solomon, 2005).

Regardless of the model type, programs seek to raise awareness about the contributions and benefits of their services. Some different geographic model structures described in a study by Meier and Beresford (2006) include: (1) a closed unit, in which the management of the patient is transferred to the palliative physician and the patient is admitted to a palliative bed; (2) an open unit, where the referring physician transfers the
patient to the palliative unit but continues to serve as the attending physician; (3) a
geographically separate unit in which the patient is isolated to palliative only care, staff
and physicians; (4) an integrated unit where palliative patients occupy some of the beds
and beds are versatile for other medically managed patients; and finally, (5) a hospice
inpatient unit where palliative patients are intermixed with hospice patients admitted to
the same unit. Because palliative care is tied so closely to hospice services, confusion
may result from how the two differ. National experts recommend that hospital palliative
care coordinate well with hospice services so that the palliative team has the ability to
specify which service would be most appropriate for the patient (Meier, 2005).

**Palliative Care versus Hospice**

Palliative care programs in acute care hospitals may provide a transition into the
hospice setting (Gade et al., 2008). For example, in one study, 72% of patients discharged
from a hospital palliative program entered hospice care (Santa-Emma et al., 2002). There
are several options that a patient may choose when diagnosed with a terminal illness in
the U. S. The primary option is usually curative, aggressive care. Unfortunately for some,
curative care does not always lead to more benefit than harm. In these cases, the hospice
option better addresses the patient and family’s need (Stevenson & Bramson, 2009).
However, admission into hospice is not limited to those whose death is imminent.

Researchers followed 4,493 patients through the progression of their terminal
illness, some with hospice, and others without. The average survival was 29 days longer
for hospice patients than for those who did not choose hospice (Connor, Pyenson, Fitch,
Spence, & Iwasaki, 2007), suggesting that hospice care may actually improve quality as well as quantity of life.

Though hospice care correlates with patient and family satisfaction, length of stay is very low nationally, with referrals frequently made late in the progression of disease. Hospice care differs from palliative care in its general requirement for a limited prognosis. To receive hospice, a patient must be certified as in the last six months of life, whereas palliative patients are designated as life-limiting, terminal or chronic and may receive care for an undefined amount of time, even years (Crawford, 2011). Hospice care includes palliative measures 100% of the time, but palliative care does not necessarily always include hospice. To understand the difference more clearly, it is important to define the hospice benefit.

Funding is provided by the federal government to support hospice care in certified agencies using a per diem reimbursement format. When the Medicare hospice benefit was started by the federal government, a major purpose was to save money. Terminal patients make up a large percentage of health care costs. Research on end stage renal disease, for example, showed that these patients exhaust a large amount of healthcare dollars and resources if treatment continues in the hospital (Ross, Alza, & Jadeja, 2006). At times this is appropriate, but when treatment is no longer therapeutic, de-escalation may embrace patient values. Hence, hospice may be a cost effective way to care for patients who no longer benefit from aggressive hospital care and instead should be cared for in alternate facilities with less aggressive care.
Since the advent of the Medicare hospice benefit in 1972, the funding and reimbursement has increased. However, a relatively low number of studies have been conducted on the administrative reimbursement and certification surrounding end-of-life care and hospice (Kirby, Keefe & Nichols, 2007). Prior to the hospice benefit, end of life was reimbursed per expense and was usually costly. As a result of these fiscal flaws, the government felt it necessary to come up with some alternative, which resulted in the hospice benefit to help lessen the direct patient cost (Stevenson & Bramson, 2009). If a hospice is certified, Medicare then provides a flat, per diem rate. The per diem rate is used to fund the care including nurse, nurse assistant, equipment, and medications related to symptom control for the illness (Hamilton, 1994).

In 1982, Congress qualified which specifications must be met in order to be a Medicare certified hospice (Hamilton, 1994). According to Stevenson and Bramson (2009), the hospice benefit was originally intended primarily for cancer patients, allowing quality end-of-life care at home and reducing unnecessary hospitalizations. Eventually, the benefit expanded to other end-stage patients. When the policy was originally conceived, it was more specific to a particular type of patient prognosis and included a cap of 210 days for use. The goal from a Medicare perspective was to replace aggressive care with a palliative approach for the dying (Banaszak-Holl & Mor, 1996). Savings would come from providing care in a less expensive setting like a home. However, because of the expansion of nursing home placement with hospice, the policy benefit was extended in 1989 to allow nursing homes to contract with hospice agencies and receive reimbursement.
To receive the benefit, a physician must certify a patient is six months or less in life expectancy, based upon natural disease progression. Care is divided into two phases. The first consists of two 90-day periods in which the patient is allowed 90 days of hospice care without reassessment. The second phase consists of an unlimited number of 60-day periods, provided the patient continues to meet the prognosis criteria even though they outlive the initial six months. There is no established cap on duration if criteria for terminal prognosis are still met. There are four levels of care within the hospice benefit. These include routine homecare, 24-hour continuing homecare, inpatient hospice care, and inpatient respite care. The per diem payment for home hospice is between $65 and $140 per day with a total cap per patient of $22,386.15 (Stevenson & Bramson, 2009).

There are now nearly 5,000 hospice programs throughout the country in all fifty states and the District of Columbia (National Hospice and Palliative Organization, 2009). There has been little research reviewing hospice services and quality across facilities (Stevenson & Bramson, 2009). The American population is an aging population, and therefore the use of palliative and end-of-life care is increasing. Hospice agencies have grown considerably from admitting 1,000 patients annually at the onset of the benefit to 700,000 patients annually in 2000 (Kirby et.al, 2007). Nursing home enrollees have tripled in the last 15 years. Traditional medical care is sometimes viewed as poor for end-of-life patients and hospice is a way to improve that care (Stevenson & Bramson, 2009).

Institutions like Skilled Nursing Facilities (SNF) and hospital based hospices have experienced increasing patient volumes since the expansion of the hospice benefit (Banaszak & Mor, 1996). These entities work with outside hospice agencies that provide
in-house care in the nursing home or hospital. Therefore, Medicare is paying twice, first for the hospice benefit and, second for the care in that institution. This may not achieve Medicare’s cost effectiveness goal. Although the goal of less medications and less aggressive care is achieved, an inpatient bed can result in high costs for institutions, and the baseline reimbursement may not cover these costs. There are arguments for and against this double payment system. Experts agree that the hospice benefit may need more well-defined government regulations in order to develop a true standard of care for hospice within an institution and to achieve the desired cost savings (Grabowski, Huskamp, Stevensom & Keating, 2007).

The growth of utilization rates in the hospice benefit has led to a major increase in for-profit hospices, which has drastically shaped the end-of-life standard and reimbursement environment. Hospice facilities have become more efficient and competitive. In 2005, the national median length of stay in a hospice was only three weeks- with one third enrolling for one week prior to death- despite the fact that the benefit can extend for six months (Kapo et. al, 2005). Late admission into hospice limits the number of palliative care services a patient receives which could reduce the quality of the dying experience. It also suggests there is a lack of knowledge and understanding of how hospice services can be added to the transitional benefit of a palliative service prior to hospice care (Kapo, Harrold, Carroll, Rickerson, & Casarett, 2005).

**Socioeconomic and Racial Influence on End-of-Life Treatment Decisions**

In 2011, Muni et al. published a study which examined how race/ethnicity and socioeconomic status (SES) may influence end-of-life care for patients in the intensive
care unit. There is little research on socioeconomic status and end-of-life decisions (Muni et al., 2011). Prior research was limited on the relationship of socioeconomic status to end-of-life care decisions (Bach et al., 1999; Barnato et al., 2006; Borum et al., 2000; Degenholtz et al., 2003; Epstein & Ayayanian, 2001; Muni, et al., 2011). Much of the available research specific to race and socioeconomic status addresses access issues and the disparities in the receipt of necessary medical interventions (Bach et al., 1999; Barnato et al., 2006; Degenholtz, et al., 2003; Epstein & Ayanian, 2001; Farjah et al., 2009; Fowler et al., 2010; Shavers & Brown, 2002).

Muni et al. (2011) found that SES did not consistently predict end-of-life-care decisions but race/ethnicity did contribute. Their study differentiated race in a crude way by categorizing patients as either white or non-white. Non-white patients were less likely to complete advance directives and were more likely to choose life-sustaining treatments and full code status. This study highlights the limitation of grouping all minorities together, which made it impossible to detect specific cultural influence amongst different minority populations (Muni et al., 2011).

Although SES was limited as a predictor of end-of-life decisions, both variables were significant predictors in the completion of advance directive documents. While lower SES patients likely avoided completion due to low literacy levels, factors influenced by race were more complex (Muni et al., 2011). One study on SES (Fowler et al., 2010) cited higher mortality for those without insurance. In this study, the focus was not on end-of-life care choices specifically, but rather the lower use of critical care resources in this population (Fowler et al.). Franks and Fiscella (2002) highlighted the
performance indicators and medically sought interventions. When evaluating a patient’s socioeconomic status, SES is difficult to define because data collection in the medical record excludes education and income. To compensate for this deficiency, Fiscella and Franks (2001) cited using both zip code and/or geocoded addresses to derive SES. Though studies of SES as a predictor of end-of-life decisions are few, studies do show underuse of hospice services in minority neighborhoods (Haas et al., 2007).

End-of-life care practices are shaped by a person’s heritage, surroundings, religion and family. They are culturally centered. (University of Washington Medical Center, 2007). Trust in end-of-life care is an ongoing issue, especially among African American populations. The Tuskegee Syphilis Study is one of the most notorious landmarks to contribute to the historical trends in the data that help support this claim (Mitchell & Mitchell, 2009). According to multiple studies, hospice is utilized by Blacks and other minorities less of the time than by Whites (Cohen, 2008; Haas et al., 2007; Smith, Earle, & McCarthy, 2009). In research examining why African American culture influences such life choices, 205 adults were surveyed to discuss the issue of death (Johnson, Kuchibhatla et al., 2008). Though some themes could be identified, one absolute cause is not understood. The results concluded that African Americans view hospice in a more negative light, have religious beliefs which conflict with the philosophies of palliative care, show an overall lack of trust in medical systems, and are less likely to be comfortable discussing death or to complete an advance directive document (Johnson, Kuchibhatla et al., 2008).
A disconnect remains between African American healthcare and the continuity of choice for medical interventions (Borum, et al., 2000). In the 2010 study by Johnson and colleagues, African Americans were less likely to receive an initial intervention to slow progression of disease, but more likely to continue with the life support. Similar studies also found that Black patients and their families rated overall end-of-life care quality lower than White patients (Welch, Teno, & Mor, 2005). African American patients who died were also younger on average than Caucasian patients (Johnson, et al., 2010). The national median life expectancy for African Americans remains six years younger than for Caucasians, which is at least partly explained by disparities in medical interventions (Epstein & Ayanian, 2001).

Cultural history may factor into this medical care conundrum (Waters, 2001). There are a limited number of studies measuring specific cultural differences in care level choices. In a review of the literature, only 13 studies were found on end-of-life decisions and African American values (Mitchell & Mitchell, 2009). However, the existing literature consistently identified increased utilization of full code status and life support services among African Americans (Mitchell & Mitchell, 2009).

African Americans are twice as likely as Caucasian patients to choose full code status instead of DNR at end of life (e.g., Borum et al., 2000; Johnson et al, 2010). African Americans are half as likely to withdraw aggressive care (Johnson, 2010). These decisions have financial implications. Moreover, African Americans averaged 32% more dollars spent in the end-of-life period, mostly accounted for by funds spent on artificial support (Hanchate, Kronman, Young-Xu, Ash, & Emanuel, 2009).
Factors associated with the differences in decisions include faith conflicts, lack of trust in healthcare, and environmental impacts, such as community influences (Johnson et al., 2010). Waters (2001) analyzed common themes among African Americans as they made end-of-life care decisions. These included societal and historical implications, reliance on family and friends to make decisions, and the impact of spiritual beliefs. One study specifically looked at the spiritual beliefs of African Americans and their aggressive care choices. Their research found that African American families often believed a miracle would result in healing, thought withdrawal was a form of assisted suicide, and felt that God, and not the medical team should be in control. They therefore sometimes declined to make decisions to de-escalate care or move to palliation and hospice (Johnson, Katja Elbert-Avila, & Tulsky, 2005). In an effort to explain the value and to increase the use of palliative and hospice medicine by the African American population, the Initiative to Improve Palliative and End-of-Life Care in the African American Community was created in 2000 (Crawley, et al., 2000). This panel was designed to improve understanding of cultural implications as applied to healthcare choices.

Minorities may also experience barriers because of concerns about costs and lack of education about end-of-life services. In a study of inner-city minorities, participants voiced the desire to provide care for their loved ones without help from outside entities. (Born, Greiner, Sylvia, Butler, & Ahluwalia, 2004). Hospice is used less often by both Hispanics and African Americans, possibly because of the environmental impact and community influences in a person’s neighborhood (Haas et al., 2007). The Haas et al.
study found lower utilization of hospice services by minorities. The authors postulated that the difference was likely a result of lack of comprehension and understanding of hospice services (Haas et al., 2007). In a 2011 qualitative study report by Boyd et al., patients indicated that faith and community support affected their care decisions more than information from physicians. Patients said that information based solely from physicians influenced them only 2% of the time (Boyd et al., 2010).

As a result of the effect of culture and socioeconomic influence on care decisions, and the continued rise in cultural disparities, there is an institutional push for culturally competent, patient centered treatment (Babcock & Robinson, 2011; Betancourt, Green, & Carrillo, 2011). This culturally competent approach aligns the overall palliative initiative intervention with all dynamics influencing a patient’s decision (Crawley, Marshall, Lo, & Koenig, 2002). Some hospitals have created staff education initiatives to improve understanding of a patient and family’s culture. Education on diverse end-of-life practice beliefs can act as a catalyst for change (University of Washington Medical Center, 2007).

**Code Status and Comfort Care Level Issues**

End-of-life care in hospitals has been designated “substandard” by the Institute of Medicine (Edens et al., 2010). These experts suggested that too many patients receive aggressive care at the end of life unnecessarily, and too many patients die in intensive care units (ICUs). In 2005, 20% of hospital deaths in the U.S. occurred in the ICU (Curtis & Rubenfield, 2005). Interestingly, more than 90% of patients who die in an ICU receive recommendations from the physicians for de-escalation of care, and more than half of that 90% die after withdrawal or limits to life-sustaining treatments (Curtis &
Rubenfield, 2005). Aggressive hospital technology is a routine part of end-of-life care, yet the issues surrounding withholding or withdrawing care are increasing (Johnson et al., 2010). The World Health Organization (WHO) stated that palliative care is not directed at hastening death but instead promotes death as a natural process, provides pain and symptom relief, and supports the bereaved (Edens et al., 2010).

According to one study, about one half of patients expected to live less than six months were put on life support during the three days prior to death (Bendaly, Groves, Julian, Gregory, & Gramelspacher, 2008). Advances in technology often make it hard to determine when a patient is truly at the end of life, and many issues contribute to this dilemma (Reynolds et al., 2005). One such issue is the distinction between withholding and withdrawing treatments. Once treatment has begun, especially if it was the patient’s decision to begin this course of care, family and clinicians may feel a moral obligation to continue the treatment. Withdrawal decisions are often made by a surrogate when the patient is no longer conscious. Furthermore, clinicians often do not make it easier for caregivers. When they feel uncertainty about prognosis, clinicians may err on the side of maximizing any “potential benefit,” despite the risk that burdens may outweigh that benefit (Reynolds et al., 2005 p. 471).

Not all patients will survive their illnesses, despite advanced technologies (Kirchhoff & Faas, 2007). Critical care unit services have changed greatly over the years, and the responsibility held by the family for the critical care patient has increased as the principle of autonomy replaces the strong paternalism that once resonated in medicine. Patient autonomy allows healthcare professionals to defer to family for
decision making at the end of life. Withholding or withdrawing treatment is a factor in almost 70% of deaths that occur in a critical care unit, and consent for these measures must come from the authorized party (Kirchhoff & Faas, 2007). Making this decision is a heavy burden for families. Emotions such as guilt, anger, regret, and even the anticipation of these emotions may act as barriers to letting go (Kirchhoff & Faas, 2007).

Healthcare professionals’ sense of timing as well as their ability to understand the social influences and emotional state of the authorized party can have a strong impact on the outcome of consent to withdraw or withhold (Kirchoff & Faas, 2007). Physicians tend to delay discussions of resuscitation choice until all therapeutic resources have been exhausted. For example, if a Do Not Resuscitate (DNR) order is discussed before the attending physician conducts a thorough dialogue about poor prognosis, the family and patient may be resistant and unable to accept the situation (Kirchoff & Faas, 2007).

Semantics can also “make or break” these sensitive conversations. Vennerman, Harris, Perish & Hamilton (2008) examined issues of DNR orders versus AND (Allow a Natural Death) orders. Based on the authorized party’s understanding of these concepts, there may be meaningful changes in the dialogue and choices made (Tompkins & Wanka-Thibault, 2001). Families often have difficulty understanding DNR orders. The idea of DNR may cause greater anxiety for families who associate it with “giving up” and negative connotations. On the other hand, the use of changed semantics like “Allow a Natural Death” increased the authorized party’s understanding during explanations of poor prognosis (Vennerman et al., 2008). Families may be more receptive to the concept of AND rather than DNR. Because emotional states largely define what a grieving
family comprehends, it may seem easier to release a loved one and allow nature to take its course. When phrased as AND, decisions to restrict Cardio Pulmonary Resuscitation may increase not only among the family members but also among the medical team (Vennerman et al., 2008).

End-of-life discussions are among the most difficult tasks required of physicians, largely due to negative attitudes towards dying in Western society (Cartwright, Bregje, Williams, Faisst, Mortier, Nilstun, et al., 2007). Because it seemingly defeats their goal of healing, physicians at times do not want to convey a terminal prognosis. However, an essential part of the care plan is omitted when the patient receives a terminal diagnosis but end of life is not discussed (Cartwright et al., 2007). Glass and Nahapetyan (2008) observed that the ongoing barriers to end-of-life conversations between elders and adult children included family dynamics, issues with trust in surrogate decision-making, a general inability to determine what patients really wanted, and the fear of death.

During many conferences with family members of terminally ill patients, doctors do the majority of the talking. Families often experience communication overload, and they may thus be unwilling or unable to offer feedback. Communication barriers are the likely result, and emotions factor into this issue (Tompkins & Wanka-Thibault, 2001). Such sensitive conversations require skills that not all physicians possess, such as gaining trust, expressing empathy, using opportune moments to discuss issues, and moving both doctor and family toward a more deliberative relationship (Babcock & Robinson, 2011; Reynolds et al., 2005).
Dying patients value symptom management as well as good relationships. Most persons truly desire to prepare for death, not to prolong it, and they do not want to burden their loved ones (Ganzini, Johnston, & Silveria, 2002). Communication between patient and doctor about prognosis and goals of care greatly influences the perceived quality of end of life. In one study, positive family regard for physicians increased not as a result of treatment but rather on the basis of how well the physician listened to the needs of the family and patient (Biola et al., 2007). However, among terminally ill ALS patients, Ganzini and colleagues (2002) found that physicians did not refer patients to hospice one-third of the time. Specific problems with end-of-life conversations included the initial efforts at communication of prognosis and expectations for the process of dying, whether the physician used medical jargon or overestimated the expected life-span leading to false hope, and how well the physician communicated throughout the illness in face-to-face meetings with patients and their families (Biola et al., 2007).

Learning how to communicate about death is a vital component of physician education. Basem and Usta (2006) surveyed fourth-year medical students and asked about their experiences in giving a poor prognosis and explaining palliation. Of these, 64% finished medical school without ever having watched a senior physician give a patient a terminal prognosis. Instead, physicians offered bright pictures of hope and did not include death in the conversation (Basem & Usta, 2006). Gawande (2010) noted that physicians overestimated the survival of their patients in more than 60% of cases. Ultimately, the best communication finds a balance between hope and reality of the progression of the illness (Cartwright et al. 2007).
Glass and Nahapetyan (2008) described end-of-life care in the U. S. as poor. America possesses a “…death denying culture…” which creates a barrier to conducting studies on dying. Likewise, well-facilitated prognosis conversations are avoided. Consequently, if a conversation is not initiated, a family cannot know their loved one’s wishes. Surrogates were found to be incorrect in guessing what the patients’ wishes were for the end of life 30% of the time (Glass & Nahapetyan, 2008). In a 2001 study, pre-operative discussions were initiated by anesthesiologists regarding end-of-life care. While 70% of patients did have known wishes pertaining to their medical treatment, only 25% had spoken to their doctor about their wishes (Grimaldo et al., 2001).

In 1991, Congress passed the Patient-Self Determination Act, which requires healthcare institutions to ask patients about advance directives. Advance directives allow a patient to make their wishes for end of life known when they cannot speak for themselves (Tierny et al., 2001). Although the vast majority of patients support the idea of completing an advance directive, only 5-15% of patients have these documents (Grimaldo et al., 2001).

One community has taken this message to heart. In Lacrosse, Wisconsin, 85% of persons studied post mortem had completed an advance directive (Gawande, 2010). The Lacrosse project, *Respecting Choices*, targeted patients with congestive heart failure (CHF), end stage renal disease, and other illnesses, focusing on advance care planning (Hammes, 2003). The Lacrosse practice has been successful due to their focus on an ongoing process of constant discussion surrounding end of life. In addition, they are averaging cost savings between $3,000 and $6,000 annually per patient, compared with
historical U.S. averages because of the advance care planning (Gunderson Lutheran, 2010).

However, even under ideal circumstances, not every patient will be able to complete a written advance directive (Milstein & Raingruber, 2007). If a patient did not complete an advance directive and can no longer communicate, the family becomes the source of decision making. Attention should be placed on transition to death for families, particularly when discussions did not occur prior to the patient’s unconscious state. The literature supports shared decision making between the physician and the family with quality end of life as the primary focus (Milstein & Raingruber, 2007).

It is important to consider what patients and families may be experiencing. Their emotions may affect their ability to process what is being explained (McSherry, Kehoe, Carroll, Kang, & Rourke, 2007). Palliative care uses the multidisciplinary approach to meet the needs of the family, with discussions centered on patient wishes, quality of life, advance care planning, and needed support for all involved (Babcock & Robinson, 2011; Fineberg, 2005).

According to Menkin (2007), tools such as cards that rank quality of life have been developed to aid professionals with end-of-life care decisions. However, the palliative team likely remains the best tool for communication. In the Transitions palliative model developed by MCCG, communication is the cornerstone of decision making (Babcock & Robinson, 2011). In their groundbreaking article in the *Journal for Palliative Medicine*, Babcock and Robinson (2011) delineated the critical components of their counselor-initiated model. Transitions Counselors assess the whole patient situation
by considering barriers, family availability, differing points of view, health literacy, language, age, family hierarchy, quality of life, advance directives, and cultural and spiritual impacts. This assessment often requires multiple meetings with family members and often entails several hours of quality communication prior to the actual consultation with the palliative care physician. The success of the consult is found in the education provided and the communication process, regardless of the choices made for end-of-life care. Even after all the information is given, the patient and family may choose death on artificial support as representative of their autonomy and values at end of life. This unique palliative model systematically identifies and assesses potential barriers to communication often before they occur (Babcock & Robinson, 2011).

**Costs at End of Life**

End-of-life care, defined in this paper as care for the terminally ill patient, constitutes 27% of the Medicare budget in the U. S. (Hogan, Lunney, Gabel, & Lynn, 2001). Experts expect that the elderly, ill and dying populations will double in the next 15 years (Appleby, 2006). No appropriate level is known for spending at end of life, and values about quality of life at end of life are different for everyone. However, many populations with both chronic and acute illness could benefit from a better, more cost efficient care plan, especially those with terminal illness (Luce & Rubenfield, 2002).

Medicaid recipients also incur high costs for medical care at the end of life which might be drastically reduced by organized palliative care interventions. Research by Morrison et al. (2011) showed an approximate $6,900 reduction per admission, per patient using palliative care. However, spending as a disease advances appears “U-
shaped, rising again toward the end” (Gawande, 2010, p. 3). The inability of government-funded agencies to assess expanding medical technologies in a financially efficient manner may contribute to the rising costs (Luft, 2009).

A well-designed palliative model may reduce costs by several thousand dollars per admission (Crawford, 2011; Spugnardi, 2008). Major cost savings come from fewer tests and decreased critical care utilization (Morrison et al., 2008). For example, one study examined a palliative program for patients admitted to the hospital with chronic pain. When correct palliative care was used to standardize a patient’s symptom management, more than $2 million were saved (Morrison et al., 2008). Other research suggests that at least 10% is saved by palliative care, and up to 20% is saved, when comparisons are made to cases with a higher length of stay (Hanson et al., 2008). The National Framework and Preferred Practices for Palliative and Hospice Care Quality Consensus Report added that palliative services can be deemed a best practice and lead to enhanced performance (National Quality Forum, 2006).

The difficulty of identifying palliative savings is the challenge of using an appropriate measurement tool to determine avoided costs. One way to identify savings is to compare palliative patients to non-palliative (Hanson et al., 2008), though this has limitations because of the variability in case complexities. In one study, non-palliative and palliative total costs were compared along with Diagnostic Related Group (DRG) coding to adjust for disease complexity. Palliative patients averaged $35,824 per hospital stay, compared with $42,731 for non-palliative patients (Bendaly et al., 2008).
The Quality-Adjusted Life Year model (QUALY) is one financial model which is currently utilized for cost reduction. Wright (2009) questioned whether the QUALY, utilized by other countries as a tool for cost reduction at the end-of-life could truly determine quality of a person’s life. Allocation of resources at end of life seems to occur more readily in other countries than in the U.S (Wright, 2009). Research shows that evidenced-based allocations of resources may decrease cost by 38% (Gunes & Yaman, 2005). Much of the ethical debate in American healthcare involves inequity of costly resources given to patients who may not benefit (Newbold, Eyles & Birch, 1995). Cost effective analysis attempts to use the QUALY scale by assessing the benefit of a therapeutic measure based on years of life combined with health related quality of life measurements (Gunes & Yaman, 2005). Research suggests that cost reductions are best accomplished in critical care units due to the expense of this environment. Cost reductions depend on lower use of potentially life-sustaining treatments for patients with terminal illnesses (Luce & Rubenfield, 2002).

Decreasing length of stay (LOS) may prove cost efficient when the overall hospital stay decreases or LOS in a medical intensive care unit goes down (Norton et al., 2007). The Center for the Advancement of Palliative Care (CAPC) has conducted a study to assess the reasons behind prolonged LOS. The CAPC proposes user-friendly templates to prove financial savings on length of stay and days saved (Meier & Beresford, 2008).

There is a national initiative to reduce overall mortality rates in hospitals. This initiative views mortality in a hospital as an avoidable adverse event, which may conflict
with a palliative approach which views death as an expected and normal outcome (Institute for Healthcare Improvement, 2005).

**Summary**

End-of-life care is expensive (Zhang, et al., 2009; Emanuel & Emanuel, 1994; Luce & Rubenfield, 2002). Some researchers have argued this is attributable to U.S. culture, while others postulated that effective advancements in medical technology inhibit the ability to grasp prognosis (Glass & Nahapetyan, 2008; Reynolds, et al., 2005). No appropriate level is known for spending at end of life, and values in quality of life at end of life differ with each individual. Historical trends for end of life document sustained high costs in the last year of life (Emanuel & Emanuel, 1994; Luce & Rubenfield, 2002). However, despite increasing use of aggressive hospital technology at the end of life, withholding and withdrawing care are also increasingly common (Johnson et al., 2010; Norton, et al., 2007; Spugnardi, 2008; Morrison et al., 2011).

Dying patients value symptom management and good relationships with their physicians. Most truly desire to prepare for death and not to prolong it. They do not want to burden their loved ones (Ganzini et al., 2002). Communication between patient and doctor about prognosis and goals of care directly impacts the quality of a patient’s end-of-life experience (Biola, et al., 2007).

Muni et al., (2011) found that socioeconomic status did not consistently predict end-of life-care decisions but that race/ethnicity may be a more powerful contributor. Trust in end-of-life care is an ongoing issue, especially amongst African American populations. African Americans seem to view hospice in a more negative light, as they
sometimes have religious beliefs that conflict with the philosophies of palliative care, have less trust in medical systems, and are less likely to be comfortable discussing death or to complete advance directives (Johnson et al., 2008). Cultural and socioeconomic influences continue to be an understudied area of the literature (Mitchell & Mitchell, 2009; Muni, et al., 2011).

There are numerous studies on the positive effects of palliative care (Edens et al., 2010; Gade, et.al, 2008; Temel et al., 2010). Researchers have proven that appropriate palliative and hospice care at end of life can lengthen life in comparison to aggressive care without palliation (Temel et al., 2010; Gawande, 2010). Palliative care is a multidisciplinary approach to the relief of symptoms and suffering and the improvement of overall quality of life during illness. This care is patient and family centered. Palliative care consultation includes a discussion surrounding long term goals of the patient, including advance care planning and/or care at the end of life (Griffin et al., 2007). The success of the consult is in the education provided and communication process, regardless of the choices made for end-of-life care. Even after all the information is given, the patient and family may choose death on artificial support to be representative of their autonomy and values at end of life (Babcock & Robinson, 2011).

In a 2008 survey of hospital based palliative programs, Georgia was ranked on the lower end of average, with 20% to 40% of hospitals recorded as having these programs (Goldsmith at al., 2008). There are many variations in hospital palliative program models (Meier & Beresford, 2006), the most common being the consultation model (Meier & Beresford, 2007). There is a national recommendation, for hospital-based
palliative programs to coordinate closely with hospice (Meier, 2005). Palliative care programs in the hospital setting meet some of the limitations of hospice inadequacies, providing a smoother transition from hospital to hospice (Gade et al., 2008). In one study, 72% of patients who were discharged alive from a hospital-based palliative program were discharged to hospice (Santa-Emma et al., 2002). Several studies have documented the cost savings and decreases in length of stay which result from palliative care in the hospital (Bendaly et al., 2008). While not all hospitals have palliative program, the majority of hospitals with 50-plus beds, have a well-established program and benefit from the services (Morrision et al., 2005).
CHAPTER 2

RESEARCH QUESTIONS AND HYPOTHESES

Research Questions

The following research questions were explored:

#1: Is there a difference in code status pre and post palliative intervention?
   a. according to gender
   b. according to race
   c. according to age
   d. according to education (socioeconomic status)
   e. according to income (socioeconomic status)
   f. according to payer source (socioeconomic status)
   g. according to disease distribution

#2: Is there a difference in Stage IV, (comfort measures status) pre and post palliative intervention?
   a. according to gender
   b. according to race
   c. according to age
   d. according to education (socioeconomic status)
   e. according to income (socioeconomic status)
   f. according to payer source (socioeconomic status)
   g. according to disease distribution
#3: Is there a difference in number of discharges to hospice following a palliative intervention?
   a. according to gender
   b. according to race
   c. according to age
   d. according to education (socioeconomic status)
   e. according to income (socioeconomic status)
   f. according to payer source (socioeconomic status)
   g. according to disease distribution

#4: Is there a difference in cost of care by length of stay pre and post palliative intervention?
   a. according to gender
   b. according to race
   c. according to age
   d. according to education (socioeconomic status)
   e. according to income (socioeconomic status)
   f. according to payer source (socioeconomic status)
   g. according to disease distribution

#5: Is there a difference in cost per days saved post palliative intervention?
   a. according to gender
   b. according to race
   c. according to age
d. according to education (socioeconomic status)

e. according to income (socioeconomic status)

f. according to payer source (socioeconomic status)

g. according to disease distribution

h. according to hospice
Hypotheses

In addition, the following hypotheses were tested:

#1: No statistical differences will be detected relative to code status pre and post palliative intervention.

a. according to gender
b. according to race
c. according to age
d. according to education (socioeconomic status)
e. according to income (socioeconomic status)
f. according to payer source (socioeconomic status)
g. according to disease distribution

#2: No statistical differences will be detected relative to Stage IV comfort measures pre and post palliative intervention.

a. according to gender
b. according to race
c. according to age
d. according to education (socioeconomic status)
e. according to income (socioeconomic status)
f. according to payer source (socioeconomic status)
g. according to disease distribution

#3: No statistical differences will be detected relative to hospice discharge post palliative intervention.
a. according to gender
b. according to race
c. according to age
d. according to education (socioeconomic status)
e. according to income (socioeconomic status)
f. according to payer source (socioeconomic status)
g. according to disease distribution

#4: No statistical differences will be detected relative to cost of care per length of stay post palliative intervention.
a. according to gender
b. according to race
c. according to age
d. according to education (socioeconomic status)
e. according to income (socioeconomic status)
f. according to payer source (socioeconomic status)
g. according to disease distribution

#5: No statistical differences will be detected relative to cost of care per days saved post palliative intervention.
a. according to gender
b. according to race
c. according to age
d. according to education (socioeconomic status)
e. according to income (socioeconomic status)
f. according to payer source (socioeconomic status)
g. according to disease distribution
h. according to hospice discharge
CHAPTER 3

METHODS

Purpose of the Study

The purpose of this study was to examine differences in treatment level at the end of life according to socioeconomic status and race. Data included treatment level measurements before and after the palliative intervention from a secondary data set. Further, this study looked at the influence of socioeconomic status and race on code status, comfort measures, discharge, and costs, for patients at the end of life who had experienced the palliative program.

This chapter is organized into the following sections to profile study methods: (1) design of the study; (2) sampling plan; (3) instrumentation; (4) collection and treatment of data; and (5) analysis and interpretation of data.

Design of the Study

This study was a quantitative research design which utilized pre-determined retrospective performance data. Variables under study were assessed via a cross-sectional research design (Creswell, 2010). The palliative intervention was defined as a clinical assessment and family conference with a palliative practitioner and a counselor from the MCCG Transitions Palliative Care Team. The intervention was a dependent variable for the total population targeted. All sample population participants had received the baseline intervention defined above prior to post measurements.

Independent, predictor variables included race, gender, age, socioeconomic status, and disease. Race was categorized as Caucasian, African American, other, and unknown.
Other included outlier races. Two variables were used to determine socioeconomic status. These included address and payer source. Address was used to determine education and income level through the geocoding mechanism. The geocoding software provided mapping technology to define the subdivisions within a census tract. The census tract defined the socioeconomic status. (Chen et al., 1998). Payer source was grouped into categories of insured and underinsured and helped determine socioeconomic status for those patients with an unidentifiable address (Muni et al., 2011).

Dependent outcome variables included pre and post measurements for dying with quality and comfort measures. More specifically, these variables included code status pre and post palliative intervention, comfort measure status pre and post palliative intervention, discharge distribution to hospice, and cost categorized by length of stay (LOS), pre and post intervention.

Patient age, patient sex, and disease distribution were included in regression analysis. Age was categorized using the National Registry for Palliative Care, and categories included ages 2-17, 18-65, and 65 plus. Minors were removed after categorizing for protection of a vulnerable population. Disease distribution was split into two categories of cancer and no cancer based on National Palliative Registry data reporting (CAPC, 2009).
Sampling Plan

This study served as a secondary analysis of a unique clinical database at the Medical Center of Central Georgia (MCCG). MCCG started their palliative program in 2004 under the direction of the Center for the Advancement of Palliative Care (CAPC) and through the use of the Transitions and Palliative Care Therapy Model (TPCT) (Babcock & Robinson, 2011). Currently, there are more than 11,330 patients who have been admitted to the program (Babcock & Robinson, 2011). This research utilized data from patients from the years 2008-2010 because data the instrument was consistent from 2008. As an end date for sample data, December 31, 2010, was chosen to ensure that no active patients were included in the data set. All patients entered into the database for these three years, with the exception of five minor patients, were eligible for this study. N=2,920 patients was the target population and sample.

Instrumentation

The data for this study was extracted from a unique clinical database. The Footprints database was used to record data from patients admitted to the palliative program at MCCG. MCCG began using Footprints in the summer of 2006. Access to patient charts allowed for accurate data to be entered directly into the system before and after a palliative intervention. The database included demographic, socioeconomic, disease distribution, and treatment status fields. New fields were added to the instrument up until 2008, from which point the instrument remained consistent. Hence, a data collection period of 2008-2010 was chosen. Since this was a secondary data analysis, no new instrument was used to collect further data. The Principal Investigator did not have
access to the medical record. However, the medical record was used by a third party at MCCG to retrieve any missing data, including payer source.

**Collection and Treatment of the Data**

This research was approved by the Georgia Southern University Institutional Review Board (IRB) and approved by the Medical Center of Central Georgia IRB representative. The authorized facility key informants were contacted prior to the study to ask for their participation, and a data cooperation agreement was proposed. The Principal Investigator also went through the necessary steps to become a Medical Center of Central Georgia doctoral intern including orientation, compliance education, health screenings and photo identification process. This was to ensure protection and privacy of the patients studied. A secondary data agreement was also executed and signed by the cooperating facility, MCCG.

The Principal Investigator looked at data retrospectively. Data collection occurred between 2004 and 2010. However, the Footprints database was used from 2006 and 2010. Fields were added up until 2008. Therefore, data were limited to the more recent years. Duplicated patients were marked by last visit to determine whether a change ultimately occurred after the intervention. Data was de-identified for the protection of patient privacy. De-identification took place through the use of the unique clinical identifier number, and finally through coded identity. Patients were coded, patient 1, patient 2 continued.

Data was extracted, cleaned and coded from patient medical records and the Footprints clinical database by a trained third party working with the Principal
Investigator to ensure objectivity and patient privacy. This assured compliance with the terms set forth by the Georgia Southern University Institutional Review Board and the MCCG secondary data agreement. Data were linked from both data sources using a unique clinical identifier which aligned with the medical record number for verification. Data were cleaned and coded into descriptive fields which included age by category, sex, and disease distribution by category. Dependent variable fields were cleaned and coded into race and payer source. Address was not coded for verification reasons and to allow for geocoding following initial coding.

Geocoding acted as a surrogate indicator of the patient’s socioeconomic status and ultimately defined elements of income and education through the process of a three level processing system and GIS Arch 10.0 software. The addresses were cleaned into fields of street number and name, zip code and unique patient identifier. Addresses were processed through the GIS software to map the address to the point. A shapefile for each of the eight designated counties, including Bibb and surrounding rural areas, Baldwin, Crawford, Houston, Jones, Monroe, Peach, and Twiggs Counties were cross matched to define the census tract for each point. Population data was processed and downloaded from the census.gov site for each of the eight counties and formatted to be cross matched with the GIS mapped tracts. From this point, the data was imputed back into the original set and each mapped address was assigned a known census tract, income and education level. Income and education variables were then coded categorically.

Outcome variable fields were cleaned and coded into code status, pre and post intervention; comfort measure status, pre and post intervention; death and discharge; and
discharge to hospice. Cost was coded and categorized by length of stay (LOS), pre and post intervention, and a mean days saved variable was identified. Categories for LOS were based on outside literature (e.g., Klein, Ross, Adams, & Gilbert, 1994). Further, a cost assessment was completed using the literature and tools suggested by the Center for the Advancement of Palliative Care (CAPC, 2008).

**Analysis and Interpretation of the Data**

The data was analyzed in multiple phases. Lone predictor variables were analyzed to determine care level outcomes as a matched pair design in a 2-by-2 table format using the McNemar test for symmetry (Norman & Streiner, 2000). The Likelihood Ratio Chi Square test was used to determine discharge to hospice. In order to further examine differences in end-of-life treatment measures further, and the association between variables and care levels, multivariate analysis was used in a Logistic Regression test. Logistic regression was used for cross sectional, retrospective data (Lachin, 2000). McNemar-Bowker tests were used to determine length of stay before and after the intervention. Finally, the t-test was used to look at the comparison of means in days saved, and Bonferroni in conjunction with ANOVA was used to analyze days saved relative to the hospice predictor variable. (Norman & Streiner, 2000).
CHAPTER 4

RESULTS

The purpose of this study was to examine differences in treatment level at the end of life according to socioeconomic status and race following a palliative care intervention. Data included treatment level measurements before and after the palliative intervention using a secondary data set. Length of stay and days saved aligned with treatment level were also examined relative to socioeconomic status and race.

This chapter is organized into the following sections to present the study results: (1) sample characteristics; (2) explanation of the geocoding process; (3) analysis of research questions and hypotheses; (4) systemic sample; (5) summary of results.

Sample Characteristics

Data from 2,920 patients were used for this analysis from a pre-collected database where collection had occurred while the patients were actively admitted into the Medical Center of Central Georgia (MCCG). Patients were chosen based on requirements set by the researcher from a pre-determined data set from years 2008-2010. Participants of the study represented patients from different demographic categories as profiled in table 4.1. Six descriptive, demographic variables were included as potential predictors of treatment options. Variables included gender, race, age, education level, income level, the patient’s payer source and their disease. Outcome variables for which pre and post measurements were taken included code status, no code to full code and full code to no code, care level status from aggressive to comfort care and from comfort to aggressive care as profiled in table 4.2. The post measurements were taken following the palliative intervention. Hospice discharge was measured for all patients. This included whether or not the patient
was admitted to hospice on discharge and the mortality of patients in the hospital. Lastly, measurements were taken on length of stay pre and post palliative intervention and days saved as a result of the intervention.

Female patients accounted for 1,473 (51.8%) of the participant population and males accounted for 1,362 (47.9%) of the participant population. Eight (.3%) of the charts were missing gender information. For the purpose of this study and because of limited information on other minorities, the study only included racial categories of White 1,432 (50.4%) and Black 996 (35%), whereas all unknown, missing and other races 415 (14.6%) were not included in the analysis. Age was defined in categories of 18-65 for 934 (32.9%) of patients and over 66 for 1,786 (62.8%) patients. Minors were not included in the sample and there were 123 patients (4.3%) whose age was missing or unknown. Socioeconomic status was defined through variables of education, income and payer source. Education was determined through the process of geocoding explained below, and divided into categories of less than high school 351 (12.3%), high school diploma, 1,054 (37.1%) and college, 339 (11.9%). Some patients, 1,099 (38.7%) were missing education information because no census match was achieved by address.

Income levels were split into categories of <$10,000 annually for 97 (3.4%), $10,000-29,999 annually for 687 (24.2%), $30,000-49,999 annually for 121 (4.3%), $50,000-74,999 annually for 28 (1%) and >$75,000 annually for 568 (20%). Again, missing data was most prevalent in income categories accounting for 1,342 (47.2%) of patients who could not be matched by address. Categories of payer source included the insured 2,323 (81.7%) defined as those patients with Medicare, private insurance and veterans sources and the underinsured 520 (18.3%) defined as those with Medicaid, no
insurance, self pay or unknown. Disease distribution categories included cancer, 641 (22%) non-cancer patients, 1,989 (68%), and missing disease distribution for 285 (10%) of patients.

Table 4.1
Sample patient characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1473</td>
<td>51.8%</td>
</tr>
<tr>
<td>Male</td>
<td>1362</td>
<td>47.9%</td>
</tr>
<tr>
<td>Missing</td>
<td>8</td>
<td>0.3%</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>1432</td>
<td>50.4%</td>
</tr>
<tr>
<td>Black</td>
<td>996</td>
<td>35%</td>
</tr>
<tr>
<td>Missing</td>
<td>415</td>
<td>14.6%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-65</td>
<td>934</td>
<td>32.9%</td>
</tr>
<tr>
<td>66 and older</td>
<td>1786</td>
<td>62.8%</td>
</tr>
<tr>
<td>Missing</td>
<td>123</td>
<td>4.3%</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than HS</td>
<td>351</td>
<td>12.3%</td>
</tr>
<tr>
<td>HS Diploma</td>
<td>1054</td>
<td>37.1%</td>
</tr>
<tr>
<td>College</td>
<td>339</td>
<td>11.9%</td>
</tr>
<tr>
<td>Missing</td>
<td>1099</td>
<td>38.7%</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 10,000</td>
<td>97</td>
<td>3.4%</td>
</tr>
<tr>
<td>10,000-29,999</td>
<td>687</td>
<td>24.2%</td>
</tr>
<tr>
<td>30,000-49,999</td>
<td>121</td>
<td>4.3%</td>
</tr>
<tr>
<td>50,000-74,999</td>
<td>28</td>
<td>1.0%</td>
</tr>
<tr>
<td>75,000 or more</td>
<td>568</td>
<td>20.0%</td>
</tr>
<tr>
<td>Missing</td>
<td>1342</td>
<td>47.2%</td>
</tr>
<tr>
<td><strong>Pay Source</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insured</td>
<td>2323</td>
<td>81.7%</td>
</tr>
<tr>
<td>Under insured</td>
<td>520</td>
<td>18.3%</td>
</tr>
<tr>
<td><strong>Disease Distribution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td>641</td>
<td>22%</td>
</tr>
<tr>
<td>No Cancer</td>
<td>1,989</td>
<td>68.2%</td>
</tr>
<tr>
<td>Missing</td>
<td>285</td>
<td>10.2%</td>
</tr>
</tbody>
</table>

Outcome variables profiled in table 4.2 show N= number of total patients for each category and percentage of patients relative to code status, comfort/aggressive measures, discharge to hospice, mortality rates and length of stay for the total population. Data in
this table does not differentiate according to predictor variables, but rather looks at outcomes for the total population before and after the palliative intervention.

Before the palliative intervention 772 patients (27.2%) of patients were DNR or no code status and 2,071 (72.8%) were full code status. After the intervention, the vast majority 2,344 (82.4%) of patients were made DNR or no code and 499 (17.6%) of patients remained a full code. There were 130 (4.6%) of patients receiving comfort care prior to the intervention and 2,713 (95.4%) receiving aggressive care. Following the intervention, 1,232 (43.3%) changed to comfort measures, while 1,611 (56.7%) continued to receive some aggressive measure. After the intervention, discharge measurements showed that 493 (17.3%) of patients used hospice care, 481 (16.9%) did not use hospice, 1,515 (53.3%) died in the hospital with hospice or palliation only, and there was missing data for discharge on 354 (12.5%) of patients.

Finally, in table 4.2 length of stay before and after the palliative intervention was measured. Before palliative involvement categories of 0-6 days show 1,665 (58.6%), 7-14 days for 550 (19.3%) patients, 15-21 days for 127 (4.5%) patients and outliers >21 days for 352 (12.4%) of patients. There was missing data on length of stay before the consult for 149 (5.2%) of patients. Following the intervention, length of stay measured as follows. The most prevalent post length of stay measure was 0-6 days for 2,100 (73.9%) patients. There were 438 (15.4%) patients whose length of stay was 7-14 days. Patients with a length of stay 15-21 days decreased to 77 (2.7%) and patients with >21 days decreased to 115 (4%). There were 113 (4%) of patients with missing data.
Table 4.2
Sample outcome variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior Code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNR</td>
<td>772</td>
<td>27.2%</td>
</tr>
<tr>
<td>Full</td>
<td>2071</td>
<td>72.8%</td>
</tr>
<tr>
<td>Ending Code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNR</td>
<td>2344</td>
<td>82.4%</td>
</tr>
<tr>
<td>Full</td>
<td>499</td>
<td>17.6%</td>
</tr>
<tr>
<td>Prior Comfort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfort only</td>
<td>130</td>
<td>4.6%</td>
</tr>
<tr>
<td>Aggressive</td>
<td>2713</td>
<td>95.4%</td>
</tr>
<tr>
<td>D/C Comfort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfort only</td>
<td>1232</td>
<td>43.3%</td>
</tr>
<tr>
<td>Aggressive</td>
<td>1611</td>
<td>56.7%</td>
</tr>
<tr>
<td>Mortality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Died hosp.</td>
<td>1515</td>
<td>53.3%</td>
</tr>
<tr>
<td>Discharged prior</td>
<td>1328</td>
<td>46.7%</td>
</tr>
<tr>
<td>Hospice D/C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used after</td>
<td>493</td>
<td>17.3%</td>
</tr>
<tr>
<td>No Hospice</td>
<td>481</td>
<td>16.9%</td>
</tr>
<tr>
<td>Died in hosp.</td>
<td>1515</td>
<td>53.3%</td>
</tr>
<tr>
<td>Missing</td>
<td>354</td>
<td>12.5%</td>
</tr>
<tr>
<td>LOS before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-6</td>
<td>1665</td>
<td>58.6%</td>
</tr>
<tr>
<td>7-14</td>
<td>550</td>
<td>19.3%</td>
</tr>
<tr>
<td>15-21</td>
<td>127</td>
<td>4.5%</td>
</tr>
<tr>
<td>&gt; 21</td>
<td>352</td>
<td>12.4%</td>
</tr>
<tr>
<td>Missing</td>
<td>149</td>
<td>5.2%</td>
</tr>
<tr>
<td>LOS after</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-6</td>
<td>2100</td>
<td>73.9%</td>
</tr>
<tr>
<td>7-14</td>
<td>438</td>
<td>15.4%</td>
</tr>
<tr>
<td>15-21</td>
<td>77</td>
<td>2.7%</td>
</tr>
<tr>
<td>&gt; 21</td>
<td>115</td>
<td>4.0%</td>
</tr>
<tr>
<td>Missing</td>
<td>113</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

**Geocoding to Define Socioeconomic Status**

Whereas race, age and gender variables were taken at face value from medical records and the footprints data source, income and education level was derived from the address included in the patients’ medical records. This required use of Arch GIS software, 10.0. Patients were de-identified with a unique identifier number for verification and addresses from the chosen surveillance area were imputed into the GIS software. The surveillance area was identified based on the majority MCCG patient population. These counties included Bibb County where MCCG is located and the
surrounding counties of Baldwin, Crawford, Houston, Jones, Monroe, Peach and Twiggs, as profiled in table 4.3. If the software was able to match the address to a point in the surveillance area, the census tract was identified. Census tracts are a geographic division, which in decreasing order fall below state and county to smaller divisions for heightened specificity and lower margin of error (Chen et al, 1998).

Blocks and block groups are smaller than census tracts but were not obtainable using the variables at an acceptable margin of error (Skinner, J Atlanta Regional Commission, 8/3/2011). The tract data was then merged with the American Community Survey 2005-2009 census data for Georgia counties, socioeconomic information (US Census Bureau, 7/28/11). In addition to processing the information for each county, social and economic information for the Georgia population overall was processed. In Georgia, 8.3% of households make less than $10,000 annually, a little over 50% make under $50,000, and 18.8% make $50,000-$74,999 annually. This computes to almost 70% of the state population making under $75,000 annually. Higher income categories range from 3.7-12% of the population in Georgia, but did not represent a significant majority of this patient population (US Census Bureau, 8/3/11).

Education averages from Factfinder showed 10.8% of the state population having received a less than high school education. There are 29.7% of Georgians who have high school equivalency and 53.2% who have some college which may include associate to graduate level (US Census Bureau, 8/3/11).
Figure 4.1. Geocoded Addresses Mapped

Population information was processed using variables for income and education level for each of the named counties. Stratification was set by the US census bureau. Income was stratified by county, tract and race. Education level was stratified by county, tract, and by gender for adults over the age of twenty-five. In the census population data there were 100-plus different categories of variables for education and income. For example, within the education variable there were variable divisions for nursery school
for females over the age of twenty-five up to graduate degrees. Because of the high number of divisions in Factfinder, the Principal Investigator combined variable categories for the purpose of this study. Counties had such a wide array of diversity and margin of error for income and education levels such that no acceptable mean could be achieved by combining the eight counties. Each patient was looked at within their own tract.

The census tract number identified through the geocoding process was then matched back to the population data and imputed into the patient dataset. Address was not always known for every patient and further, some addresses included lot numbers, P.O. box numbers, nursing homes, transferring facilities and other errors making some addresses unidentifiable and without match. For this reason, socioeconomic status under the auspices of income and education was limited to \( n = 1,794 \) total matches. The margin of error varied dependent upon the county and the variable measured. Inferences were made by using known patient race and sex combined with the coordinating measurement within the tract.

**Analysis of the Research Questions and Hypotheses**

The prospective cross-sectional large sample data in this study were analyzed using the McNemar test of symmetry for matched pairs of full code to no code and no code to full code before and after the palliative intervention. The McNemar test was also used to match pairs of comfort to aggressive care and aggressive to comfort care prior to and following the intervention. A 2-by-2 table format was used and data were treated as a paired observation.

Following the test of symmetry a multivariate analysis was conducted through a logistic regression model to look at multiple exposure or predictor variables to determine
which would have impact on outcomes of code status change and change to comfort or aggressive measures.

**Research Question #1**

*Is there a difference in code status pre and post palliative intervention?*

**Null Hypothesis #1**

*No statistical differences will be detected relative to code status pre and post palliative intervention?*

McNemar's test was used to test for symmetry in change yielding a p-value <0.0001, indicating significance. The McNemar analysis was run to see if the change from full code to no code was the same as the change from no code to full code. As profiled in table 4.3 the change from full code to no code is 55.4% as compared to 0.1% changing from no code to full code. Thus the intervention has both statistical significance and a clinical impact on code status. The odds ratio for a matched pair design is OR=575 with a 95% confidence interval (169, 1620). This means that the odds are about 575 times greater to change to Do Not Resuscitate.

**Table 4.3**

*Total population code status change following the intervention*

<table>
<thead>
<tr>
<th></th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Code</td>
<td>496 (17.4%)</td>
<td></td>
</tr>
<tr>
<td>No Code</td>
<td>3 (0.1%)</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>503</td>
<td>2843</td>
</tr>
<tr>
<td><strong>After</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Code</td>
<td><strong>1575 (55.4%)</strong></td>
<td>2071</td>
</tr>
<tr>
<td>No Code</td>
<td>769 (27%)</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2344</td>
<td></td>
</tr>
</tbody>
</table>

**Research Question #1a**

*Is there a difference in code status according to gender pre and post palliative intervention?*
Hypothesis #1a

No statistical differences will be detected by gender relative to code status pre and post palliative intervention?

The McNemar Test to test for symmetry in change yielded a p-value<.0001 for both males and females when only gender was used as a predictor variable to look at code status changes. As profiled in tables 4.4 and 4.5, the change from full code to no code was 53.4% as compared to a 0.1% change from no code to full code in females. Among males, there was a 57.6% change from full code to no code as compared to a 0.1% change from no code to full code. For females, the odds ratio for a matched pair design is OR=393 with a 95% confidence interval (98, 1574). For males, the odds ratio for a matched pair design is OR=785 with a 95% confidence interval (110, 5579). The intervention has both a statistically significant difference and a clinical impact on code status for both males and females, with minimal difference detected between the two.

Table 4.4
Code status change according to gender-females

<table>
<thead>
<tr>
<th>Female</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Code</td>
<td>No Code</td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>256(17.4%)</td>
<td>786(53.4%)</td>
<td>1042</td>
</tr>
<tr>
<td>Full Code</td>
<td>2(0.1%)</td>
<td>429(29.1%)</td>
<td>431</td>
</tr>
<tr>
<td>No Code</td>
<td>258</td>
<td>1215</td>
<td>1473</td>
</tr>
</tbody>
</table>

McNemar's p<0.0001; OR= 393 with 95% C.I. (98, 1574)

Table 4.5
Code status change according to gender-males

<table>
<thead>
<tr>
<th>Male</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Code</td>
<td>No Code</td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>239(17.5%)</td>
<td>785(57.6%)</td>
<td>1024</td>
</tr>
<tr>
<td>Full Code</td>
<td>1(0.1%)</td>
<td>337(24.7%)</td>
<td>338</td>
</tr>
<tr>
<td>No Code</td>
<td>240</td>
<td>1122</td>
<td>1362</td>
</tr>
</tbody>
</table>

McNemar's p<0.0001; OR= 785 with 95% C.I. (110, 5579)

Research Question #1b- Race
Is there a difference in code status according to race pre and post palliative intervention?

Hypothesis #1b

No statistical differences will be detected by race relative to code status pre and post palliative intervention?

The McNemar Test to test for symmetry in change yielded a p-value<.0001 for both Black and White using only race as a predictor variable to look at code status changes as profiled in tables 4.6 and 4.7. These showed the change from full code to no code was 56.7% as compared to a 0.1% change from no code to full code in Blacks with the odds ratio for a matched pair design of OR= 565 with a 95% confidence interval (79,4018). Among Whites, there was a 55.2 % change from full code to no code as compared to a 0.1% change from no code to full code with an odds ratio for a matched pair design of OR=396 with a 95% confidence interval (99,1584) as profiled in table 4.8.

Table 4.6
Code status change according to race-Blacks

<table>
<thead>
<tr>
<th>Black</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Code</td>
<td>No Code</td>
<td></td>
</tr>
<tr>
<td>Full Code</td>
<td>220(22.1%)</td>
<td>565(56.7%)</td>
<td>785</td>
</tr>
<tr>
<td>No Code</td>
<td>1(0.1%)</td>
<td>210(21.1%)</td>
<td>211</td>
</tr>
<tr>
<td>Total</td>
<td>221</td>
<td>775</td>
<td>996</td>
</tr>
</tbody>
</table>

McNemar's p<0.0001; OR= 565 with 95% C.I. (79, 4018)

Table 4.7
Code status change according to race-Whites

<table>
<thead>
<tr>
<th>White</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Code</td>
<td>No Code</td>
<td></td>
</tr>
<tr>
<td>Full Code</td>
<td>173(12.1%)</td>
<td>791(55.2%)</td>
<td>964</td>
</tr>
<tr>
<td>No Code</td>
<td>2(0.1%)</td>
<td>466(32.5%)</td>
<td>468</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>1257</td>
<td>1432</td>
</tr>
</tbody>
</table>

McNemar's P<0.0001; OR= 396 with 95% C.I. (99, 1584)
The intervention has both a statistically significant and a clinical impact on code status for both Black and Whites with differences detected.

**Research Question #1c**

Is there a difference in code status according to age pre and post palliative intervention?

**Hypothesis #1c**

No statistical difference will be detected by age relative to code status pre and post palliative intervention?

The McNemar Test to test for symmetry in change yielded a p-value<.0001 for ages 18-65 and 66-plus when only age was used as a predictor variable to look at code status changes between categories of 18-65 and 66-plus as profiled in tables 4.8 and 4.9. Tests showed the change from full code to no code was 57.7% as compared to a 0.2% change from no code to full code in those aged 18-65 with an odds ratio for a matched pair design of OR=269 with a 95% confidence interval (67,1080). Among those aged 66-plus, there was a 54.5% change from full code to no code as compared to a 0.1% change from no code to full code with an odds ratio for a matched pair design of OR=974 with a 95% confidence interval (137,6921) as profiled in table 4.9.

**Table 4.8**

<table>
<thead>
<tr>
<th>18-65</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Code</td>
<td>No Code</td>
</tr>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Code</td>
<td>227(24.3%)</td>
<td>539(57.7%)</td>
</tr>
<tr>
<td>No Code</td>
<td>2(0.2%)</td>
<td>166(17.8%)</td>
</tr>
<tr>
<td>Total</td>
<td>229</td>
<td>705</td>
</tr>
</tbody>
</table>

McNemar's $p<0.0001; OR= 269$ with 95% C.I. (67, 1080)
Table 4.9
*Code status change according to age- 66+

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Code</td>
<td>242 (13.5%)</td>
<td>974 (54.5%)</td>
<td>1216</td>
</tr>
<tr>
<td>No Code</td>
<td>1 (0.1%)</td>
<td>569 (1.9%)</td>
<td>570</td>
</tr>
<tr>
<td>Total</td>
<td>243</td>
<td>1543</td>
<td>1786</td>
</tr>
</tbody>
</table>

McNemar's $P<0.0001; \ OR= 974$ with 95% C.I. (137,6921)

The intervention has both statistical significance and a clinical impact on code status for both the 18-65 and the 66-plus group with differences detected.

**Research Question #1d- Socioeconomic Status**

Is there a difference in code status change according to education level pre and post palliative intervention?

**Hypothesis Question #1d- Socioeconomic Status**

No statistical difference will be detected by education relative to code status pre and post palliative intervention?

The McNemar Test to test for symmetry in change yielded a $p$ value $<.0001$ for less than high school, high school, and college categories using only education level as a predictor variable for some of the categories to look at code status changes as profiled in tables 4.10, 4.11, and 4.12. Patients with less than high school showed the change from full code to no code was 55% as compared to a 0 change from no code to full code. An OR could not be computed because of the zero value and no confidence intervals were, therefore computed. In patients with a high school diploma there was a 55.7% change from full code to no code and a 0.2% change from no code to full code or equivalent of an odds ratio for a matched pair design of $OR= 292$ with a 95% confidence interval (73,1168). Among those patients with some college and beyond, there was a 51.9 %
change from full code to no code but a 0 change from no code to full code with an inability to compute odds ratio or an overall confidence interval because of the zero value, as profiled in table 4.12. This analysis shows some clinical impact and significance.

Table 4.10
Code status change according to education level: less than high school

<table>
<thead>
<tr>
<th>Less than High School</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Code</td>
<td>68(19.4%)</td>
<td>193(55.0%)</td>
<td>261</td>
</tr>
<tr>
<td>No Code</td>
<td>0</td>
<td>90(25.6%)</td>
<td>90</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>68</td>
<td>283</td>
<td>351</td>
</tr>
</tbody>
</table>

McNemar's $p<0.0001$; OR= cannot compute with 95% C.I. (cannot compute)

Table 4.11
Code status change according to education level: high school diploma

<table>
<thead>
<tr>
<th>High School Diploma</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Code</td>
<td>175(16.6%)</td>
<td>583(55.7%)</td>
<td>758</td>
</tr>
<tr>
<td>No Code</td>
<td>2(0.2%)</td>
<td>294(27.9%)</td>
<td>296</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>177</td>
<td>877</td>
<td>1054</td>
</tr>
</tbody>
</table>

McNemar's $p<0.0001$; OR= 292 with 95% C.I. (73, 1168)

Table 4.12
Code status change according to education level: college

<table>
<thead>
<tr>
<th>College</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Code</td>
<td>54(15.9%)</td>
<td>176(51.9%)</td>
<td>230</td>
</tr>
<tr>
<td>No Code</td>
<td>0</td>
<td>109(32.2%)</td>
<td>109</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>54</td>
<td>285</td>
<td>339</td>
</tr>
</tbody>
</table>

McNemar's $p<0.0001$; OR= cannot compute with 95% C.I. (cannot compute)

Research Question #1e- Socioeconomic Status

Is there a difference in code status change according to income pre and post palliative the intervention?

Hypothesis #1e- Socioeconomic Status
No statistical difference will be detected by income relative to code status pre and post palliative intervention?

The McNemar Test to test for symmetry in change yielded a p value<.0001 for all income levels for those categories computed when only income was used as a predictor variable to look at code status changes in categories of <$10,000, $10,000-29,999, $30,000-49,999, $50,000-74,999 and >$75,000 as profiled in tables 4.13-4.17. No computations could be completed for those in categories of <$10,000, $30,000-49,999 and $50,000-74,999 because of the 0 value which would not allow for an OR to be computed. Patients making $10,000-29,999 showed a change from full code to no code was 57.1% as compared to a 0.1% change from no code to full code with an odds ratio for a matched pair design of OR=392 with a 95% confidence interval (55,2790). Among those patients with an income > $75,000 , there was a 49.5% change from full code to no code as compared to a 0.2% change from no code to full code with an odds ratio for a matched pair design of OR=281 with a 95% confidence interval (39,2000). This analysis shows the intervention has clinical impact and significance.

Table 4.13
Code status change according to income- < 10,000

<table>
<thead>
<tr>
<th>Less than $10,000</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td></td>
</tr>
<tr>
<td>Full Code</td>
<td>13(13.4%)</td>
<td>56(57.7%)</td>
</tr>
<tr>
<td>No Code</td>
<td>0</td>
<td>28(28.9%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>84</strong></td>
</tr>
</tbody>
</table>

McNemar's  p<0.0001; OR= cannot compute with 95% C.I. ( cannot compute )
Table 4.14
*Code status change according to income- 10,000-29,999*

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Code</td>
<td>121(17.6%)</td>
<td>392(57.1%)</td>
<td>513</td>
</tr>
<tr>
<td>No Code</td>
<td>1(0.1%)</td>
<td>173(25.2%)</td>
<td>174</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>122</strong></td>
<td><strong>565</strong></td>
<td><strong>687</strong></td>
</tr>
</tbody>
</table>

*McNemar's  P<0.0001; OR= 392 with 95% C.I. (55,2790)*

Table 4.15
*Code status change according to income- 30,000-49,999*

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Code</td>
<td>16(13.2%)</td>
<td>75(62.0%)</td>
<td>91</td>
</tr>
<tr>
<td>No Code</td>
<td>0</td>
<td>30(24.8%)</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
<td><strong>105</strong></td>
<td><strong>121</strong></td>
</tr>
</tbody>
</table>

*McNemar's  p<0.0001; OR= cannot compute with 95% C.I. (cannot compute)*

Table 4.16
*Code status change according to income- 50,000-74,999*

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Code</td>
<td>3(10.7%)</td>
<td>21(75.0%)</td>
<td>24</td>
</tr>
<tr>
<td>No Code</td>
<td>0</td>
<td>4(14.3%)</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3</strong></td>
<td><strong>25</strong></td>
<td><strong>28</strong></td>
</tr>
</tbody>
</table>

*McNemar's  P<0.0001; OR= cannot compute with 95% C.I. (cannot compute)*

Table 4.17
*Code status change according to income- >75,000*

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Code</td>
<td>87(15.3%)</td>
<td>281(49.5%)</td>
<td>368</td>
</tr>
<tr>
<td>No Code</td>
<td>1(0.2%)</td>
<td>199(35.0%)</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>88</strong></td>
<td><strong>480</strong></td>
<td><strong>568</strong></td>
</tr>
</tbody>
</table>

*McNemar's  p<0.0001; OR= 281 with 95% C.I. (39,2000)*

Research Question #1f- Socioeconomic Status

Is there a difference in code status change according to payer source pre and post palliative intervention?
Hypothesis #1f

No statistical difference will be detected by payer source relative to code status pre and post palliative intervention?

The McNemar Test to test for symmetry in change using a p value<.0001 was used for both underinsured and insured with only payer source as a predictor variable to look at code status changes between the insured and the underinsured as profiled in tables 4.18 and 4.19. This showed change from full code to no code was 54.3% as compared to a 0.1% change from no code to full code in the insured with an odds ratio for a matched pair design of OR=631 with a 95% confidence interval (158,2526). Among the underinsured, there was a 60.2% change from full code to no code as compared to a 0.2% change from no code to full code with an odds ratio for a matched pair design of OR=313 with a 95% confidence interval (44,2229) as profiled in table 4.19. The intervention has both a statistically significant yield and a clinical impact on code status for both the insured and the underinsured with difference detected.

Table 4.18
Code status change according to payer source- insured

<table>
<thead>
<tr>
<th>Insured Status</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Code</td>
<td>378(16.3%)</td>
<td>1262(54.3%)</td>
</tr>
<tr>
<td>No Code</td>
<td>2(0.1%)</td>
<td>681(29.3%)</td>
</tr>
<tr>
<td>Total</td>
<td>380</td>
<td>1943</td>
</tr>
</tbody>
</table>

McNemar’s P<0.0001; OR= 631 with 95% C.I. (158, 2526)

Table 4.19
Code status change according to payer source- underinsured

<table>
<thead>
<tr>
<th>Underinsured Status</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Code</td>
<td>118(22.7%)</td>
<td>313(60.2%)</td>
</tr>
<tr>
<td>No Code</td>
<td>1(0.2%)</td>
<td>88(16.9%)</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>401</td>
</tr>
</tbody>
</table>

McNemar’s P<0.0001; OR=313 with 95% C.I. (44, 2229)
Research Question #1g

Is there a difference in code status change according to disease distribution pre and post and palliative intervention?

Hypothesis #1g

No statistical difference will be detected by disease distribution relative to code status pre and post palliative intervention?

The McNemar Test to test for symmetry in change using a p value<.0001 for those with and without cancer with only disease distribution as a predictor variable to look at code status changes between those patients with cancer and those without cancer as profiled in tables 4.20 and 4.21. This showed change from full code to no code was 57.9% as compared to a 0 change from no code to full code in females with an odds ratio for a matched pair design where the OR could not be computed and thus the confidence interval could not be computed. Among those patients without cancer, there was a 55.3% change from full code to no code as compared to a 0.1% change from no code to full code with an odds ratio for a matched pair design of OR=550 with a 95% confidence interval (137,2201) as profiled in table 4.21.

Table 4.20

<table>
<thead>
<tr>
<th>Cancer</th>
<th>Before</th>
<th></th>
<th>After</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Code</td>
<td>No Code</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Code</td>
<td>117(18.3%)</td>
<td>371(57.9%)</td>
<td></td>
<td>488</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Code</td>
<td>0</td>
<td>153(23.9%)</td>
<td></td>
<td>153</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>117</td>
<td>524</td>
<td></td>
<td>641</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

McNemar's $P<0.0001$; OR= cannot compute with 95% C.I. (cannot compute)
Table 4.21
*Code status change according to disease distribution: no cancer*

<table>
<thead>
<tr>
<th>Non-Cancer</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Code</td>
<td>337(16.9%)</td>
<td>1437</td>
</tr>
<tr>
<td>No Code</td>
<td>2(0.1%)</td>
<td>552</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>339</td>
<td>1989</td>
</tr>
</tbody>
</table>

McNemar's P<0.0001; OR=550 with 95% C.I. (137,2201)

A model of final code status based on possible predictors was used through the Logistic Regression Test analysis profiled in table 4.22. The model was used to predict the Logit of having a full code status after the intervention. The initial model used the predictor variables: prior code status, race, age, gender, education, income, and payer source.

Table 4.22
*Code status*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior Code Status</td>
<td>4.072</td>
<td>0.714</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Race</td>
<td>0.609</td>
<td>0.195</td>
<td>0.002</td>
</tr>
<tr>
<td>Age</td>
<td>-0.602</td>
<td>0.169</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.098</td>
<td>0.152</td>
<td>0.520</td>
</tr>
<tr>
<td>Education (multiple coeffs)</td>
<td></td>
<td>0.892</td>
<td></td>
</tr>
<tr>
<td>Income (multiple coeffs)</td>
<td></td>
<td>0.048</td>
<td></td>
</tr>
<tr>
<td>Pay Source</td>
<td>-0.215</td>
<td>0.204</td>
<td>0.292</td>
</tr>
<tr>
<td>Constant</td>
<td>-5.559</td>
<td>0.822</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prior Code Status (full code is reference)</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.001</td>
<td>0.582</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race (black is reference)</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.529</td>
<td>0.119</td>
<td>0.002</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age (66 and older is reference)</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.512</td>
<td>0.119</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Constant</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-5.217</td>
<td>0.587</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
The test yielded Black, full code prior and over 66 for a Logit of full code resulting in odds ratio of 0.301. The test yielded Black, full code, and aged 18-65 for a Logit of full code equaling odds ratio of 0.503.

Combining the results of both yields, the odds ratio of a full code for a person ages 18-65 to a person aged 66-plus with everything else being equal is 1.67. Younger people are more likely to have a full code as opposed to older people. Further, Blacks have higher odds of a full code status than Whites and those with a prior full code status have higher odds of a final full status than those with a no code.

**Research Question #2**

**Is there a difference in Stage IV, (comfort measures status) pre and post palliative intervention?**

**Hypothesis #2**

**No statistical differences will be detected relative to comfort measures status pre and post palliative intervention?**

The McNemar Test to test for symmetry in matched pairs yielding a p value<.0001 for the total patient population to look at care level changes between comfort and aggressive measures, as profiled in table 4.23, showed change from aggressive to comfort was 39% as compared to a 0.2% change from comfort to aggressive with an odds ratio for a matched pair design of OR=185 with a 95% confidence interval (83,412). The intervention has both statistical significance and has a clinical impact on care level status as resulting comfort measures are 185 times more likely than resulting aggressive measures.
Table 4.23
Aggressive/Comfort measure changes- total population

<table>
<thead>
<tr>
<th></th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>Aggressive</td>
<td>Comfort only</td>
</tr>
<tr>
<td>Aggressive</td>
<td>1605(56.5%)</td>
<td>1108(39.0%)</td>
</tr>
<tr>
<td>Comfort only</td>
<td>6(0.2%)</td>
<td>124(4.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>1611</td>
<td>1232</td>
</tr>
</tbody>
</table>

McNemar's p-value <0.0001; OR = 185 with 95% C.I. (83, 412)

Research Question #2a

Is there a difference in Stage IV, (comfort measures status) according to gender pre and post palliative intervention?

Hypothesis #2a

No statistical differences will be detected by gender relative to comfort measures status pre and post palliative intervention?

The McNemar Test to test for symmetry in matched pairs using a p value<.0001 for both females and males was used with only gender as a predictor variable to look at care level changes between comfort and aggressive measures as profiled in tables 4.24 and 4.25. This showed a change in females from aggressive to comfort measures was 39.2% as compared to a 0.3% change from comfort to aggressive with an odds ratio for a matched pair design of OR= 145 with a 95% confidence interval (54,386). Among males, there was a 38.7% change from aggressive to comfort measure status as compared to a 0.1% change from comfort to aggressive measures with an odds ratio for a matched pair design of OR=263 with a 95% confidence interval (66,1056). The intervention has both statistical significance and a clinical impact on care level status for both females and males with slight differences detected.
Table 4.24
Aggressive/Comfort measure change based on gender- female

<table>
<thead>
<tr>
<th>Female</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>Aggressive</td>
<td>Comfort only</td>
</tr>
<tr>
<td>Aggressive</td>
<td>820(55.7%)</td>
<td>578(39.2%)</td>
</tr>
<tr>
<td>Comfort only</td>
<td>4(0.3%)</td>
<td>71(4.8%)</td>
</tr>
<tr>
<td>Total</td>
<td>824</td>
<td>649</td>
</tr>
</tbody>
</table>

McNemar's  $p<0.0001$; OR= 145 with 95% C.I. (54, 386)

Table 4.25
Aggressive/Comfort measures change based on gender- male

<table>
<thead>
<tr>
<th>Male</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>Aggressive</td>
<td>Comfort only</td>
</tr>
<tr>
<td>Aggressive</td>
<td>780(57.3%)</td>
<td>527(38.7%)</td>
</tr>
<tr>
<td>Comfort only</td>
<td>2(0.1%)</td>
<td>53(3.9%)</td>
</tr>
<tr>
<td>Total</td>
<td>782</td>
<td>580</td>
</tr>
</tbody>
</table>

McNemar's  $P<0.0001$; OR= 263 with 95% C.I. (66, 1056)

Research Question #2b

Is there a difference in Stage IV, (comfort measures status) according to race pre and post palliative intervention?

Hypothesis #2b

No statistical differences will be detected by race relative to comfort measures status pre and post palliative intervention?

The McNemar Test to test for symmetry in matched pairs using a p value<.0001 for both race categories was used with only race as a predictor variable to look at care level changes between comfort and aggressive measures as profiled in tables 4.26 and 4.27. This showed a change from aggressive to comfort in Blacks was 31.4% as compared to a 0.2% change from comfort to aggressive measures with an odds ratio for a matched pair design of OR=157 with a 95% confidence interval (39,629). Among Whites, there was a 44.4% change from aggressive to comfort care as compared to a 0.1% change from comfort to aggressive care with an odds ratio for a matched pair
design of OR=318 with a 95% confidence interval (79,1274). The intervention has both a statistically significant yield and a clinical impact on care level status for both Black and Whites, and with significant difference detected.

Table 4.26
Aggressive/Comfort measure status by race - Black

<table>
<thead>
<tr>
<th>Black</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressive</td>
<td>648(65.1%)</td>
<td>313(31.4%)</td>
<td>961</td>
</tr>
<tr>
<td>Comfort only</td>
<td>2(0.2%)</td>
<td>33(3.3%)</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>650</td>
<td>346</td>
<td>996</td>
</tr>
</tbody>
</table>

McNemar's $p<0.0001$; OR = 157 with 95% C.I. (39, 629)

Table 4.27
Aggressive/Comfort measure status by race - White

<table>
<thead>
<tr>
<th>White</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressive</td>
<td>725(50.6%)</td>
<td>636(44.4%)</td>
<td>1361</td>
</tr>
<tr>
<td>Comfort only</td>
<td>2(0.1%)</td>
<td>69(4.8%)</td>
<td>71</td>
</tr>
<tr>
<td>Total</td>
<td>727</td>
<td>705</td>
<td>1432</td>
</tr>
</tbody>
</table>

McNemar's $P<0.0001$; OR = 318 with 95% C.I. (79, 1274)

Research Question #2c
Is there a difference in Stage IV, (comfort measures status) according to age pre and post palliative intervention?

Hypothesis #2c
No statistical differences will be detected by age relative to comfort measures status pre and post palliative intervention?

The McNemar Test to test for symmetry in matched pairs using a p value<.0001 was used with only age as a predictor variable for both age groups to look at care level changes between comfort and aggressive measures as profiled in tables 4.28 and 4.29. Those aged 18-65 showed change from aggressive to comfort status was 36% as
compared to a 0.1% change from comfort to aggressive with an odds ratio for a matched pair design of OR=336 with a 95% confidence interval (47,2392). Among those aged 66+, there was a 41.4% change from aggressive to comfort care as compared to a 0.2% change from comfort to aggressive care with an odds ratio for a matched pair design of OR=185 with a 95% confidence interval (65,494). The intervention has both a statistically significant yield and a clinical impact on care level status for both age groups, and with significant differences detected.

Table 4.28
Aggressive/Comfort measure status by age-18-65

<table>
<thead>
<tr>
<th></th>
<th>18-65 After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfort only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>18-65</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressive</td>
<td>575(61.6%)</td>
<td>911</td>
</tr>
<tr>
<td>Comfort</td>
<td>336(36.0%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>911</td>
<td></td>
</tr>
</tbody>
</table>

McNemar's $p<0.0001$; OR= 336 with 95% C.I. (47, 2392)

Table 4.29
Aggressive/Comfort measure status by age-66+

<table>
<thead>
<tr>
<th></th>
<th>66+ After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfort only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>66+</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressive</td>
<td>950(53.2%)</td>
<td>1689</td>
</tr>
<tr>
<td>Comfort</td>
<td>739(41.4%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1689</td>
<td></td>
</tr>
</tbody>
</table>

McNemar's $P<0.0001$; OR= 185 with 95% C.I. (69, 494)

Research Question #2d- socioeconomic status

Is there a difference in Stage IV, (comfort measures status) according to education level pre and post palliative intervention?

Hypothesis #2d

No statistical differences will be detected by education level relative to comfort measures status pre and post palliative intervention?
The McNemar Test to test for symmetry in matched pairs using a p value < .0001 was used for all education levels with only education as a predictor variable to look at care level changes between comfort and aggressive measures as profiled in tables 4.30, 4.31 and 4.32. For those in the less than high school category, a 31.3% change showed from aggressive to comfort measures. There was a zero for the measure from comfort to aggressive so no OR or confidence interval computation could be conducted. Those with a high school diploma showed a change from aggressive to comfort at 41.8% as compared to a 0.3% change from comfort to aggressive in with an odds ratio for a matched pair design of OR=147 with a 95% confidence interval (47,58). Among those patients with some college education and beyond, there was a 41% change from aggressive to comfort measures as compared to a 0.6% change from comfort to aggressive care with an odds ratio for a matched pair design at OR= 70 with a 95% confidence interval (17,281).

Table 4.30
Aggressive/Comfort measure status by education level- less than high school

<table>
<thead>
<tr>
<th>Less than H.S.</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>Aggressive</td>
<td>Comfort only</td>
</tr>
<tr>
<td>Aggressive</td>
<td>227</td>
<td>337</td>
</tr>
<tr>
<td>Comfort only</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>227</td>
<td>124</td>
</tr>
</tbody>
</table>

McNemar's  *p* < 0.0001; OR= cannot compute with 95% C.I. (cannot compute)

Table 4.31
Aggressive/Comfort measure status by education level- high school diploma

<table>
<thead>
<tr>
<th>H.S. Diploma</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>Aggressive</td>
<td>Comfort only</td>
</tr>
<tr>
<td>Aggressive</td>
<td>563</td>
<td>1004</td>
</tr>
<tr>
<td>Comfort only</td>
<td>30 (0.3%)</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>566</td>
<td>488</td>
</tr>
</tbody>
</table>

McNemar's  *p* < 0.0001; OR= 147 with 95% C.I. (47,458)
Table 4.32
*Aggressive/Comfort measures status by education level- college*

<table>
<thead>
<tr>
<th>College</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aggressive</td>
<td>Comfort only</td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td>179(52.8%)</td>
<td>139(41.0%)</td>
<td>318</td>
</tr>
<tr>
<td>Comfort only</td>
<td>2(0.6%)</td>
<td>19(5.6%)</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>181</td>
<td>158</td>
<td>339</td>
</tr>
</tbody>
</table>

*McNemar's P<0.0001; OR= 70 with 95% C.I. (17,281)*

This shows that there was some significance when comparing education levels, while others produced no significance at all. A comparison could therefore not be made between all three education variables.

**Research Question #2e- socioeconomic status**

Is there a difference in Stage IV, (comfort measures status) according to income pre and post palliative intervention?

**Hypothesis #2e**

No statistical differences will be detected by income relative to comfort measures status pre and post palliative intervention?

The McNemar Test to test for symmetry in matched pairs using a p value<.0001 for income categories and with only income as a predictor variable to look at care level changes between comfort and aggressive measures as profiled in tables 4.33-4.37, showed change from aggressive to comfort was 29.9% as compared to a 1.0% change from comfort to aggressive in patients with income <$10,000 with an odds ratio for a matched pair design of OR=29 with a 95% confidence interval (4,213). For those in the income level ranging from $10,000-29,999, a computation could not be made. Patients with income from the $30,000-49,999 showed change from aggressive to comfort was at
47.1% as compared to a 0.8% change from comfort to aggressive with an odds ratio for a matched pair design of OR=57 with a 95% confidence interval (8,425).

Those in the $50,000-74,999 income range could not be computed because of zero value in comfort to aggressive. Lastly, those patients making >$75,000 showed a change from aggressive to comfort was 41% as compared to a 0.2% change from comfort to aggressive with an odds ratio for a matched pair design of OR=223 with a 95% confidence interval (31,1590).

Table 4.33
Aggressive/Comfort Measure Status by income < $10,000

<table>
<thead>
<tr>
<th>Less than $10,000</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aggressive</td>
<td>Comfort only</td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>29(29.9%)</td>
<td>29(29.9%)</td>
<td>58</td>
</tr>
<tr>
<td>Comfort only</td>
<td>1(1.0%)</td>
<td>4(4.1%)</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>33</td>
<td>63</td>
</tr>
</tbody>
</table>

McNemar's p<0.0001; OR = 29 with 95% C.I. (4, 213)

Table 4.34
Aggressive/Comfort measure Status by income-10,000-29,999

<table>
<thead>
<tr>
<th>$10,000-$29,999</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aggressive</td>
<td>Comfort only</td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td>399(58.1%)</td>
<td>261(38.0%)</td>
<td>660</td>
</tr>
<tr>
<td>Comfort only</td>
<td>0</td>
<td>27(3.9%)</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>399</td>
<td>288</td>
<td>687</td>
</tr>
</tbody>
</table>

McNemar's P<0.0001; OR= cannot compute with 95% C.I. (cannot compute)

Table 4.35
Aggressive/Comfort measure status by income- 30,000-49,999

<table>
<thead>
<tr>
<th>$30,000-$49,999</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aggressive</td>
<td>Comfort only</td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td>58(47.9%)</td>
<td>57(47.1%)</td>
<td>115</td>
</tr>
<tr>
<td>Comfort only</td>
<td>1(0.8%)</td>
<td>5(4.1%)</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>62</td>
<td>121</td>
</tr>
</tbody>
</table>

McNemar's p<0.0001; OR = 57 with 95% C.I. (8,425)
Table 4.36  
**Aggressive/Comfort measure status by income- 50,000-74,999**

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aggressive</td>
<td>Comfort only</td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td>15(53.6%)</td>
<td>12(42.9%)</td>
<td>27</td>
</tr>
<tr>
<td>Comfort only</td>
<td>0</td>
<td>1(3.6%)</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

McNemar's  P<0.0001; OR= cannot compute with 95% C.I. (cannot compute)

Table 4.37  
**Aggressive/Comfort measure status by income- >75,000**

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aggressive</td>
<td>Comfort only</td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td>306(53.9%)</td>
<td>223(41.0%)</td>
<td>529</td>
</tr>
<tr>
<td>Comfort only</td>
<td>1(0.2%)</td>
<td>28(4.9%)</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>307</td>
<td>251</td>
<td>558</td>
</tr>
</tbody>
</table>

McNemar's  p<0.0001; OR= 223 with 95% C.I. (31, 1390)

**Research Question #2f**

Is there a difference in Stage IV, (comfort measures status) according to payer source pre and post palliative intervention?

**Hypothesis #2f**

No statistical differences will be detected by payer source relative to comfort measures status pre and post palliative intervention?

The McNemar Test to test for symmetry in matched pairs using a p value<.0001 for both insured and underinsured was used with only payer source as a predictor variable to look at care level changes between comfort and aggressive measures as profiled in tables 4.38 and 4.39. The insured population showed a change from aggressive to comfort was 38.4 % as compared to a 0.1% change from comfort to aggressive with an odds ratio for a matched pair design of OR= 298 with a 95% confidence interval (96,925). Among the underinsured, there was a 41.3% change from aggressive to comfort measures as compared to a 0.6% change from comfort to aggressive care with an odds ratio for a...
matched pair design of OR=72 with a 95% confidence interval (23,224). The intervention has both a statistically significant impact and a clinical impact on code status for both the insured and underinsured with no difference detected.

Table 4.38
*Aggressive/Comfort measure status by payer source - insured*

<table>
<thead>
<tr>
<th>Insured</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aggressive</td>
<td>Comfort only</td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td>1311(56.4%)</td>
<td>893(38.4%)</td>
<td>2204</td>
</tr>
<tr>
<td>Comfort only</td>
<td>3(0.1%)</td>
<td>116(5.0%)</td>
<td>119</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1314</td>
<td>1009</td>
<td>2323</td>
</tr>
</tbody>
</table>

*McNemar's P<0.0001; OR= 298 with 95% C.I. (96,925)*

Table 4.39:
*Aggressive/Comfort measure status by payer source - underinsured*

<table>
<thead>
<tr>
<th>Underinsured</th>
<th>Before</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aggressive</td>
<td>Comfort only</td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td>294(56.5)</td>
<td>215(41.3%)</td>
<td>509</td>
</tr>
<tr>
<td>Comfort only</td>
<td>3(0.6%)</td>
<td>8(1.5%)</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>297</td>
<td>223</td>
<td>520</td>
</tr>
</tbody>
</table>

*McNemar’s P<0.0001; OR=72 with 95% C.I (23, 224)*

**Research Question #2g**

Is there a difference in Stage IV, (comfort measures status) according to disease distribution pre and post palliative intervention?

**Hypothesis #2g**

No statistical differences will be detected by disease relative to comfort measures status pre and post palliative intervention?

The McNemar Test to test for symmetry in matched pairs using a p value<.0001 for both categories was used with only disease as a predictor variable to look at care level changes between comfort and aggressive measures as profiled in tables 4.40 and 4.41. Patients with cancer showed a change from aggressive to comfort measures at 36% as
compared to a 0.2% change from comfort to aggressive with an odds ratio for a matched pair design of OR=231 with a 95% confidence interval (32,1647). Among those without cancer, there was a 40.8% change from aggressive to comfort as compared to a 0.3% change from comfort to aggressive measures with an odds ratio for a matched pair design of OR=162 with a 95% confidence interval (67,391). The intervention has both statistical significance and a clinical impact on code status for those patients with cancer and those with other primary conditions with limited differences detected.

Table 4.40

Aggressive/comfort status for disease distribution-cancer

<table>
<thead>
<tr>
<th>Cancer</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td>385(60.1%)</td>
<td>386</td>
</tr>
<tr>
<td>Comfort only</td>
<td>231(36.0%)</td>
<td>255</td>
</tr>
<tr>
<td>Total</td>
<td>616</td>
<td>641</td>
</tr>
</tbody>
</table>

McNemar's P<0.0001; OR= 231 with 95% C.I. (32, 1647)

Table 4.41

Aggressive/comfort status for disease distribution-no cancer

<table>
<thead>
<tr>
<th>Non-Cancer</th>
<th>After</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td>1087(54.7)</td>
<td>812</td>
</tr>
<tr>
<td>Comfort only</td>
<td>85(4.3%)</td>
<td>85(4.3%)</td>
</tr>
<tr>
<td>Total</td>
<td>1092</td>
<td>897</td>
</tr>
</tbody>
</table>

McNemar's P<0.0001; OR=162 with 95% C.I. (67, 391)

A model of final comfort status based on possible predictors using Logistic Regression shown below in tables 4.42. The model was used to predict the Logit of having an aggressive care status after the intervention. Using the initial model with the predictor variables: prior comfort status, race, age, gender, education, income, and payer source, the analysis yielded the following results: The Logit for Blacks with less than
high school and prior aggressive care is computed to an odds of 2.42. For Whites with less than high school and prior aggressive care the odds are 1.57. The odds ratio is 1.54.

Therefore, the odds of having a Black patient with aggressive care and less than a high school education is 54% greater than that of a White patient with the same education and prior aggressive care. A White patient in the same level is more than 50% more likely to have comfort measure status. Based on multiple full model-reduced model fittings and tests, the best final model is summarized below in table 4.42 with less than high school as the reference.

Table 4.42
*Aggressive/ Comfort measures Status- multiple variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior care</td>
<td>3.412</td>
<td>0.596</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Race</td>
<td>0.488</td>
<td>0.139</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Age</td>
<td>-0.242</td>
<td>0.130</td>
<td>0.063</td>
</tr>
<tr>
<td>Gender</td>
<td>0.130</td>
<td>0.111</td>
<td>0.240</td>
</tr>
<tr>
<td>Education</td>
<td>(multiple coefficients)</td>
<td></td>
<td>0.020</td>
</tr>
<tr>
<td>Income</td>
<td>(multiple coefficients)</td>
<td></td>
<td>0.158</td>
</tr>
<tr>
<td>Pay Source</td>
<td>-0.244</td>
<td>0.161</td>
<td>0.130</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.587</td>
<td>0.663</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Prior Comfort (Aggressive Care)</td>
<td>3.444</td>
<td>0.594</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Race (black is reference)</td>
<td>0.431</td>
<td>0.115</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Education (HS diploma)</td>
<td>-0.384</td>
<td>0.148</td>
<td>0.009</td>
</tr>
<tr>
<td>Education (College)</td>
<td>-0.256</td>
<td>0.183</td>
<td>0.163</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.991</td>
<td>0.606</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Research Question 3a, 3c, 3f

Is there a difference in Hospice discharge according to (a)gender, (c)age (f)payer source following a palliative care intervention?

Hypothesis #3a

No statistical differences will be detected relative to (a)gender, (c)age, (f)payer source for hospice discharge following the palliative intervention?

The Likelihood Ratio Chi-Square Test was used to measure outcome differences relative to hospice discharge. The likelihood function was first used to determine the best model and to determine the parameters of the chi-square. Many of the demographic variables produced no significant results relative to hospice discharge. When measuring gender differences, as profiled in table 4.43, p=0.131 there was no significance shown. When measuring age difference as profiled in table 4.44, p=0.757, with no significant difference between those aged 18-65 and those aged 66-plus. When measuring pay source profiled in table 4.45, p=0.311, with no significant differences in the insured and underinsured with respect to hospice discharge. Thus, we fail to reject the null for these research questions.

Table 4.43
Hospice discharge according to gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Used Hospice after discharge</th>
<th>No Hospice</th>
<th>Died in Hospital * hospice in hospital</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>243(18.7%)</td>
<td>269(20.7%)</td>
<td>785(60.5%)</td>
<td>1297(100.0%)</td>
</tr>
<tr>
<td>Male</td>
<td>247(20.8%)</td>
<td>212(17.9%)</td>
<td>727(61.3%)</td>
<td>1186(100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>490</td>
<td>481</td>
<td>1512</td>
<td>2483</td>
</tr>
</tbody>
</table>

Likelihood Ratio Chi-Square = 4.065 with 2 df, p=0.131 No significant difference in hospice with respect to gender.
Table 4.44
Hospice discharge according to age

<table>
<thead>
<tr>
<th>Age</th>
<th>Used Hospice after discharge</th>
<th>No Hospice</th>
<th>Died in Hospital * hospice in hospital</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-65</td>
<td>154(19.1%)</td>
<td>153(18.9%)</td>
<td>501(62.0%)</td>
<td>808(100.0%)</td>
</tr>
<tr>
<td>66 and older</td>
<td>317(20.1%)</td>
<td>305(19.4%)</td>
<td>953(60.5%)</td>
<td>1575(100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>471</td>
<td>458</td>
<td>1454</td>
<td>2383</td>
</tr>
</tbody>
</table>

Likelihood Ratio Chi-Square = 0.557 with 2 df, p=0.757 No significant difference in hospice with respect to age.

Table 4.45
Hospice discharge according to pay source

<table>
<thead>
<tr>
<th>Pay Source</th>
<th>Used Hospice after discharge</th>
<th>No Hospice</th>
<th>Died in Hospital * hospice in hospital</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insured</td>
<td>413(20.3%)</td>
<td>395(19.4%)</td>
<td>1224(60.2%)</td>
<td>2032(100%)</td>
</tr>
<tr>
<td>Underinsured</td>
<td>80(17.5%)</td>
<td>86(18.8%)</td>
<td>291(63.7%)</td>
<td>457(100%)</td>
</tr>
<tr>
<td>Total</td>
<td>493</td>
<td>481</td>
<td>1515</td>
<td>2489</td>
</tr>
</tbody>
</table>

Likelihood Ratio Chi-Square = 2.337 with 2 df, p=0.311 No significant difference in hospice with respect to Pay Source.

Research Question #3b

Is there a difference in Hospice discharge according to race following a palliative care intervention?

Hypothesis #3b

No statistical differences will be detected relative to race for hospice discharge following the palliative intervention?
When measuring for differences in hospice rate of discharge with respect to race, the Likelihood Ratio Chi-Square Test yielded $p<.001$, which is statistically significant indicating that Blacks are less likely than Whites to use hospice services as profiled in table 4.46.

Table 4.46

<table>
<thead>
<tr>
<th></th>
<th>Hospice Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Used Hospice after discharge</td>
</tr>
<tr>
<td>Black</td>
<td>172 (19.4%)</td>
</tr>
<tr>
<td>White</td>
<td>228 (18.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
</tr>
</tbody>
</table>

Likelihood Ratio Chi-Square = 48.140 with 2 df, $p<0.001$

Research Question #3d

Is there a difference in Hospice discharge according to socioeconomic status-education level following a palliative care intervention?

Hypothesis #3d

No statistical differences will be detected by socioeconomic status-education level hospice discharge following the palliative intervention?

For those patients measured by education level, table 4.47 presents data to profile the results of the Likelihood Chi-Square analysis in comparing patients and education level. The test yielded a $p=0.010$. This shows that there was significant difference among those patients with less than high school, indicating a higher likelihood for no hospice for these patients.
Table 4.47

*Hospice discharge according to education*

<table>
<thead>
<tr>
<th>Education</th>
<th>Used Hospice after discharge</th>
<th>No Hospice</th>
<th>Died in Hospital * hospice in hospital</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than HS</td>
<td>76(24.9%)</td>
<td>74(24.3%)</td>
<td>155(50.8%)</td>
<td>305(100.0%)</td>
</tr>
<tr>
<td>HS Diploma</td>
<td>187(19.8%)</td>
<td>174(18.4%)</td>
<td>584(61.8%)</td>
<td>945(100.0%)</td>
</tr>
<tr>
<td>College</td>
<td>54(19.4%)</td>
<td>48(17.3%)</td>
<td>176(63.3%)</td>
<td>278(100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>317</td>
<td>296</td>
<td>915</td>
<td>1528</td>
</tr>
</tbody>
</table>

Likelihood Ratio Chi-Square = 13.187 with 4 df, p=0.010

**Research Question #3e -**

Is there a difference in hospice discharge according to socioeconomic status-income following a palliative care intervention?

**Hypothesis #3e**

No statistical differences will be detected by socioeconomic discharge-income relative to hospice discharge following the palliative intervention?

For the income variable comparison relative to hospice discharge, table 4.48 profiles the results of the Likelihood Ratio Chi-Square analysis.

Table 4.48

*Hospice discharge according to income*

<table>
<thead>
<tr>
<th>Income</th>
<th>Used Hospice after discharge</th>
<th>No Hospice</th>
<th>Died in Hospital * hospice in hospital</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10,000</td>
<td>14(15.9%)</td>
<td>20(22.7%)</td>
<td>54(61.4%)</td>
<td>88(100%)</td>
</tr>
<tr>
<td>10,000-29,999</td>
<td>115(19.0%)</td>
<td>135(22.3%)</td>
<td>356(58.7%)</td>
<td>606(100%)</td>
</tr>
<tr>
<td>30,000-49,999</td>
<td>17(17.2%)</td>
<td>15(15.2%)</td>
<td>67(67.7%)</td>
<td>99(100%)</td>
</tr>
<tr>
<td>50,000-74,999</td>
<td>7(25.9%)</td>
<td>4(14.8%)</td>
<td>16(59.3%)</td>
<td>27(100%)</td>
</tr>
<tr>
<td>75,000 or more</td>
<td>100(20.3%)</td>
<td>68(13.8%)</td>
<td>324(65.9%)</td>
<td>492(100%)</td>
</tr>
<tr>
<td>Total</td>
<td>253</td>
<td>242</td>
<td>817</td>
<td>1312</td>
</tr>
</tbody>
</table>

Likelihood Ratio Chi-Square = 16.794 with 8 df, p=0.032
The test is comparing those with lower income levels to those with higher incomes. The test yields a p=0.032. This shows a significant difference with respect to income. As income goes up, the percentage for no hospice decreases.

Research Question 3g

Is there a difference in Hospice discharge according to disease following a palliative care intervention?

Hypothesis #3g

No statistical differences will be detected relative to disease for hospice discharge following the palliative intervention

Using the Likelihood Ratio Chi-Square as profiled in table 4.49, cancer patients were compared to non-cancer patients. The test yielded a p<.001 showing a higher number of cancer patients used hospice care. This indicated significance.

Table 4.49

<table>
<thead>
<tr>
<th>Distribution of Disease</th>
<th>Hospice D/C</th>
<th>Cancer</th>
<th>Not Cancer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used Hospice after discharge</td>
<td>157(34.6%)</td>
<td>297(65.4%)</td>
<td>454</td>
<td></td>
</tr>
<tr>
<td>No Hospice</td>
<td>97(21.9%)</td>
<td>346(78.1%)</td>
<td>443(100%)</td>
<td></td>
</tr>
<tr>
<td>Died in Hospital * hospice in hospital</td>
<td>314(22.3%)</td>
<td>1091(77.7%)</td>
<td>1405</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>568</td>
<td>1734</td>
<td>2302</td>
<td></td>
</tr>
</tbody>
</table>

*Likelihood Ratio Chi-Square = 29.904 with 2 df, p<0.001.*

For the purpose of measuring the intervention’s impact and differences in variable groups according to cost, length of stay and days saved were used as measurement tools. For the length of stay analysis, the McNemar-Bowker test of symmetry was used. To
analyze the days saved measurement of cost, both the t-test and the Anova and Bonferroni were used as profiled in the tables below.

**Research Question #4**

Is there a difference in cost per length of stay pre and post palliative care intervention?

**Hypothesis #4**

No statistical differences will be detected relative to cost per length of stay pre and post palliative intervention

For the total population of patients, length of stay categories were measured using the McNemar-Bowker test of symmetry. Table 4.50 profiles data to show significance in the decrease of length of stay post intervention. The test yielded a p-value<0.001, showing a lack of symmetry in the distribution of changes and significance. The decrease overall occurs in category 7-14 days with a change from 15.5% to 10.0%, in the category of 15-21 days the change was 3.3% to 1.2% and in >21 days a decrease from 8.6% to 1.4%.

Table 4.50

<table>
<thead>
<tr>
<th>Length of stay</th>
<th>0-6 days</th>
<th>7-14 days</th>
<th>15-21 days</th>
<th>&gt; 21 days</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>% is of total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOS before PCC</td>
<td>1275 (49.3%)</td>
<td>259 (10.0%)</td>
<td>31 (1.2%)</td>
<td>36 (1.4%)</td>
<td>1601 (61.9%)</td>
</tr>
<tr>
<td>0-6 days</td>
<td>1275 (49.3%)</td>
<td>259 (10.0%)</td>
<td>31 (1.2%)</td>
<td>36 (1.4%)</td>
<td>1601 (61.9%)</td>
</tr>
<tr>
<td>7-14 days</td>
<td>402 (15.5%)</td>
<td>74 (2.9%)</td>
<td>20 (0.8%)</td>
<td>29 (1.1%)</td>
<td>525 (20.3%)</td>
</tr>
<tr>
<td>15-21 days</td>
<td>85 (3.3%)</td>
<td>23 (0.9%)</td>
<td>5 (0.2%)</td>
<td>8 (0.3%)</td>
<td>121 (4.7%)</td>
</tr>
<tr>
<td>&gt; 21 days</td>
<td>222 (8.6%)</td>
<td>60 (2.3%)</td>
<td>19 (0.7%)</td>
<td>39 (1.5%)</td>
<td>340 (13.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>1984 (76.7%)</td>
<td>416 (16.1%)</td>
<td>75 (2.9%)</td>
<td>112 (4.3%)</td>
<td>2587 (100%)</td>
</tr>
</tbody>
</table>

McNemar-Bowker test of symmetry statistic is 205.656 with 6 df and p<0.001.
Research Question #4a, 4b, 4c, 4d, 4e, 4f, 4g

Is there a difference in cost per length of stay pre and post palliative care intervention?

Hypothesis #4a, 4b, 4c, 4d, 4e, 4f, 4g

No statistical differences will be detected relative to cost per length of stay pre and post palliative intervention

As stated above, length of stay could not be computed in 2-by-2 tables for each variable analysis, or further for a multivariate analysis. Therefore, we cannot accept nor fail to reject the null.

Research Question #5

Is there a difference in cost per days saved following a palliative care intervention?

Hypothesis #5

No statistical differences will be detected relative to cost per days saved following palliative intervention?

The overall days saved mean=3.68 with a standard deviation=4.05 for N=2843.

The t-test analysis showed no significant differences with respect to gender, race, pay source, education or income, indicating the null hypothesis was accepted for variables of race and socioeconomic status, age and gender with respect to cost. However, significance was found with variables of age profiled in table 4.51, in disease distribution profiled in table 4.52, and in hospice discharge profiled in table 4.53 below.

Research Question #5a, 5b, 5d, 5e, 5f

Is there a difference in cost per days saved following a palliative care intervention?
Hypothesis #5a, 5b, 5d, 5e, 5f

No statistical differences will be detected relative to cost per days saved following palliative intervention

Again, no significance was found with respect to gender, race, education, income, or payer source. Therefore, we fail to reject the null.

Research Question #5c

Is there a difference in cost per days saved by age following a palliative care intervention?

Hypothesis #5c

No statistical differences will be detected by age relative to cost per days saved following palliative intervention

Using age as a lone predictor variable for days saved, the t-test analysis yielded a p-value=0.036 profiled in table 4.51 with a difference of .35 days between ages 18-65 and those aged 66+. This indicated significance and a clinical cost impact post intervention. The patients aged 18-65 had a higher mean for days saved.

Table 4.51

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-statistic (df)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-65</td>
<td>934</td>
<td>3.93</td>
<td>4.73</td>
<td>2.104(2718)</td>
<td>0.036</td>
</tr>
<tr>
<td>66 and older</td>
<td>1786</td>
<td>3.58</td>
<td>3.65</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant difference and it is .35 days per 18-65 year old person

Research Question #5g

Is there a difference in cost per days saved by disease following a palliative care intervention?
Hypothesis #5g

No statistical differences will be detected relative to cost per days saved by disease following palliative intervention?

Using disease distribution as a lone predictor variable for days saved, the t-test analysis yielded a p-value=.002 with a .59 difference between those with cancer and those with no cancer, profiled in table 4.52.

This indicated significance and a clinical cost impact. The non-cancer patients had a higher mean of days saved.

Table 4.52

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-statistic (df)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td>641</td>
<td>3.28</td>
<td>3.39</td>
<td>-3.133(2628)</td>
<td>0.002</td>
</tr>
<tr>
<td>Not Cancer</td>
<td>1989</td>
<td>3.87</td>
<td>4.30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant difference and it is .59 days per non-cancer person

Research Question #5h

Is there a difference in cost per days saved by a hospice population following a palliative care intervention?

Hypothesis #5h

No statistical differences will be detected relative to cost per days saved by hospice population following palliative intervention?

Using only discharge to hospice as a variable for days saved the Anova and Bonferri test yielded a p-value<0.001, which is statistically significant. Bonferri adjustments to the cell means were made profiled in table 4.53.
Table 4.53
Days saved according to hospice status

<table>
<thead>
<tr>
<th>Hospice D/C</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>F-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used hospice after discharge</td>
<td>493</td>
<td>3.69b</td>
<td>3.73</td>
<td>58.997</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No hospice</td>
<td>481</td>
<td>2.02a</td>
<td>3.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Died in Hospital * hospice in hospital</td>
<td>1515</td>
<td>4.29c</td>
<td>4.09</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a statistically significant result with $p<0.001$. Bonferroni adjustments to the cell means were made and the letters next to the means indicate the difference. Means with the same letters are not different

Systematic Sample

In addition to the analysis above, a ten percent systematic sample was selected to determine if there were cost savings in dollars as a result of the palliative intervention. The Principal Investigator did not use the total patient population because of privacy constraints and access stipulations placed by the Medical Center. To extract cost data in an objective way which upheld the regulations and efficiency constraints placed by both MCCG and the Georgia Southern University Institutional Review Board, the cost data had to be taken directly from the record by an objective third party. A financial audit then took place by an objective third party for each random patient chosen. The information extracted gave the costs per day pre and post palliative intervention. A difference was then taken from both categories and the average mean of the days before and after the intervention along with the average mean difference was calculated as profiled in table 4.54.

To achieve the sample, a unique identifier called “patient one” was randomly selected and from there, every tenth patient became part of this systematic sample. The
total random sampling process resulted in approximately 10% of the total patient population, or n=292.

The mean cost per day prior to a palliative intervention was $2,229.46. The mean cost per day following the palliative intervention was $731.17. The mean difference in cost per day was $1,498.29. This systematic random sample showed that $1,498.29 per day was saved after a palliative intervention occurred.

To conduct the cost analysis, adjustments were made for twenty-six patients with missing data, equaling 9.3% of the randomly chosen population. It should also be stated that there was a $0.00 amount following the intervention for forty-seven of the patients randomly chosen. This was probably a result of withdrawal of all care and subsequent death following the intervention, or a result of immediate discharge from the hospital to a hospice facility following the intervention. It does not skew analysis to include the $0.00 patients because the intervention was the means to the withdrawal or the discharge.

Table 4.54
Cost savings average pre and post intervention: random sample n=292

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2229.46</td>
<td>$731.17</td>
<td>$1498.29</td>
</tr>
</tbody>
</table>

**Summary of Results**

In summary, the data showed significant findings. The McNemar test of symmetry in code status revealed six significant findings when using lone predictor variables to look at change in code status pre and post palliative intervention, rejecting Hypotheses #1, #1a, #1b, #1c, #1e, and #1f outright. For Hypotheses #1d and #1g, one category showed difference but others could not be computed resulting in the inability to
reject or to fail to reject the null. The multivariate analysis concluded that specific differences were found when looking at race and age. Both younger people and Blacks were more likely to stay full code. The McNemar test of symmetry in aggressive and comfort measures also yielded six significant findings and rejected Hypothesis #2, #2a, #2b, #2c, #2f, and #2g. Hypothesis #2d and #2e could neither be accepted nor rejected because of the inability to compute all categories. Specific differences were found when looking at race and socioeconomic status in the same analysis. The multivariate analysis for comfort and aggressive measures showed that Blacks with a less than high school education were more likely to choose aggressive measures than Whites with the same education level.

The Likelihood Ratio Chi-Square Test relative to hospice discharge revealed four significant findings, rejecting Hypotheses #3b, #3d, #3e and #3g and failing to reject #3a, #3c, and 3f. The overall findings suggest that Blacks are less likely to use hospice. Those with lower income are more likely to choose “no hospice” and cancer patients are more likely to use hospice. Specific differences were found when looking at race and socioeconomic status.

The McNemar-Bowker test of symmetry to test for costs saved by length of stay showed significant decrease in overall costs, rejecting Hypothesis #4. However, due to the complexity of the variables, there was no known current test to compare other predictor variables and Hypotheses #4a- #4g could neither be proven or disproven. Both the t-test and ANOVA Bonferroni showed five significant findings comparing days saved as a cost measure and rejected Hypotheses #5, #5c, #5e, #5g and #5h. However, no
differences were found relative to gender, race or socioeconomic status, failing to reject Hypothesis #5a, #5b, #5d, #5e, and #5f.

In summary of the data analysis, it appears that the palliative intervention showed significant differences in change of treatment level choices and significant cost reduction overall. It also appears that there are some significant differences dependent upon variables of age, race, disease and socioeconomic status.
CHAPTER 5
SUMMARY, DISCUSSION, AND CONCLUSIONS

The purpose of this study was to examine differences in treatment level at the end of life according to socioeconomic status and race. The intent is to provide a better understanding of population differences in treatment level preferences at the end of life and further understanding of the palliative intervention.

This final chapter is organized into the sections listed below which pertain to the relevant discussion, conclusions, and implications of this study: (1) summary of findings; (2) conclusions; (3) discussion; (4) strengths and limitations; (5) implications for public health; and finally (6) suggestions for future research.

Summary of Findings

This study represented a large patient population in both rural and suburban Georgia. A sample size of N= 2,920 showed a diverse patient population by gender, age, illness, race and socioeconomic status representing eight counties surrounding the Macon area.

Research Question #1: Descriptive analysis of data pertaining to code status demonstrated that the change to no code status/DNR was over 50% higher than the change from no code to full code. Data reflected the significance of change for both gender variables, both race categories of Black and White, in both age categories, and for both cancer and non-cancer patients. Data further reflected this significant shift from full code to no code in some categories of education and income in both categories of the insured and the underinsured indicating changes in levels of socioeconomic status. Further investigation of the code status changes presented data that suggested that
younger people are more likely to stay full code than DNR when everything else is equal. Multivariate analysis also demonstrated that Blacks have higher odds of full code status than Whites. It was somewhat surprising that when socioeconomic status was factored into the multivariate analysis, it did not seem to affect the outcome with any significance.

**Research Question #2:** Descriptive analysis of data pertaining to comfort and aggressive measures showed close to a 40% higher rate of change from aggressive to comfort measures only, than from comfort to aggressive measures following the intervention for the total population. This is a surprisingly high change from aggressive to comfort because comfort measures was defined as no treatment, only pain measures and did not include those who shifted from for example Status I to Status III defined above. Only Status IV patients were measured as comfort. Therefore, de-escalation may have been present but not included in the data set. The measurement was used to represent those who decided to remove all therapeutic curative measures.

Significant results consistent with this total population outcome were seen in variables of gender, both female and male, in both categories of race and age, and in both cancer and non-cancer patients. Not all categories of education and income could be computed, but for those that could, significant changes consistent with this same outcome were found. With respect to socioeconomic status, the payer source variable measure showed change from aggressive to comfort measures at almost 40% for both the insured and underinsured.

Further investigation of the interaction between socioeconomic status and race in change of care levels using a multivariate analysis concluded that Blacks with an education level less than high school had 54% higher chance likelihood of using
aggressive measures at the end of life than Whites with the same education level when all else was equal and patients were receiving aggressive care prior to the intervention. This is consistent with the literature cited in this study.

**Research Question #3:** In an examination of the factors as they may relate to a hospice discharge, there were significant differences in hospice use based on race and socioeconomic status. Overall, Whites were over 10% more likely to use hospice services than Blacks. Those with lower income were less likely to use hospice services. There was a greater than 10% difference in “no hospice” results from the lowest income category to those making the highest income. Surprisingly, there was no significant difference in use of hospice according to payer source. Those patients with an education level less than high school had a higher percentage of “no hospice” than those with more education. Not surprisingly, a higher number of cancer patients used hospice than those without cancer, a close to 30% difference. The original use for hospice services was for cancer patients alone, so this may support a historical trend (Stevenson & Bramson, 2009).

**Research Question #4:** In examining cost per length of stay, a multivariate analysis was not included. However, for total population there was an overall decrease in length of stay following a palliative intervention. The highest percentage decrease was in those patients with >21 days, who showed over 5% decrease in length of stay.

**Research Question #5:** In examining cost per days saved, the overall mean average days saved was 3.68 per patient following the palliative intervention. There was a significant difference in days saved within variables of age, disease and use of hospice discharge. Those who utilized hospice after discharge or in the hospital saved 1-2 days of acute hospital care at the end of life.
To summarize the findings, the palliative intervention proved to align with the literature in respect to racial differences in choices of care. Blacks used aggressive, non-hospice care more of the time than Whites. When looking at the interaction between race and socioeconomic status, the most significant difference is seen in Blacks and Whites with less than high school education where Blacks choose aggressive measures over 50% of the time more often. Further, this study’s findings showed that variables including disease, age and socioeconomic status may factor into end of life decision making, but all are impacted by the palliative intervention.

**Conclusions**

From this study, the following conclusions are made:

- Palliative care does make an overall impact on the use of full code status and aggressive care measures. The intervention does result in the de-escalation of care for a significant number of patients (Research Questions #1,2).
- America is very evidently, a society rooted in autonomy, and that applies to healthcare at end of life in the surveyed region. Income, race, and education did not deny the patient the ability to make an individual and diverse choice about what treatments they would choose though these variables likely shaped that decision (Research Questions #1,2,3).
- This study adds to the literature on the positive effects of a palliative care program in a hospital (Research Questions #1,2,4,5).
• Despite increasing use of aggressive hospital technology at the end of life, withholding and withdrawing care are also increasingly common (Research Question #2).

• Though Georgia has a grade “D” rank on their palliative programs (Goldsmith, Dietrich, Qingling, Morrison, 2008), the Medical Center of Central Georgia has a program achieving significant results. (Research Questions #1, 2,3,4,5)

• Blacks utilize aggressive non-hospice care more of the time than Whites (Research Questions #2,3).

• Specific to the interaction between socioeconomic status and race with regard to change in care levels, Blacks with less than high school education have a greater than 50% chance of aggressive care than Whites with the same SES.

• Socioeconomic status appears to impact the use of hospice (Research Question #3).

• Cancer patients appear to utilize hospice more of the time than non-cancer patients (Research Question #3).

• This study adds to the literature on healthcare cost reductions, showing that palliative care interventions do result in resource savings through the decreased length of stay, costs per day and days saved measurement tools (Research Questions #4,5).

• Even after all information is given to a patient and family through the conference and clinical intervention, some may still favor a death on artificial support as their autonomous choice representing their values for quality of end of life (Research Questions #s 1,2,3).
Discussion of Findings

Researchers have argued that heightened technology has become so effective at extending life that it has become more difficult to recognize what defines end of life (Reynolds et al., 2005). Some researchers argue this is attributable to our U.S. culture, while others postulate that effective advancements in medical technology inhibit the ability to grasp prognosis (Glass, 2008; Reynolds, Cooper, & McKneally, 2005). A person’s end of life may be wrought with tests, treatments, hospitalizations, resuscitations and artificial support, or it may be without all medical means including Cardio Pulmonary Resuscitation and removed from the hospital realm entirely. This remains true with this research population. Each patient experienced a unique end of life, dependent upon many factors.

End-of-life care practices are shaped by a person’s heritage, surroundings, religion and family. They are culturally centered. (University of Washington Medical Center, 2007). The significant differences revealed in this study show that treatment level decisions at end of life are unique to the patient and may change based upon the palliative intervention, family conference and dynamics addressed by healthcare professionals.

Dying patients value symptom management and good relationships with their physicians. Communication between patient and doctor about prognosis and goals of care directly impact the quality of a patient’s end-of-life experience (Biola, Sloane, Williams, Daalman, Williams, Zimmerman, 2007). The findings in this study show that patients may be impacted to de-escalate their care when a lengthy conference and attention to symptom and pain management is shown through the palliative intervention.
The findings in this study align with the body of literature with respect to racial inconsistencies with end-of-life care. This study attempted to confirm or disprove those documented differences following this unique intervention, and ultimately showed that a palliative intervention is beneficial in both race categories but the differential in Blacks favoring more aggressive care, remains.

Findings consistent with variables within the realm of socioeconomic status demonstrate the potential weaknesses of a patient centered approach in hospital care. Socioeconomic information is not a part of the medical record. Only address and payer source offers some glimpse at socioeconomic background. Without income and education information, it may become difficult for healthcare professionals to address barriers of a socioeconomic nature. For example, literacy issues and poverty can only be assumed, not known.

Findings specific to hospice care demonstrate the continued resistance towards hospice dependent on race, disease, education and income. Consistent with the literature, the underutilization of hospice by all groups is documented. Though this quantitative research does not suggest why the underuse, predictor variables do give some examination of characteristics which may impact the decision.

Healthcare is expensive. Several studies document the cost savings and decrease in lengths of stay which result from palliative care in the hospital (Bendaly, Groves, Juliari, Gramelspacher, 2008). This study adds to that body of literature and findings suggest that hospital costs are saved through lower length of stay after the intervention has taken place. This study’s cost findings show the profound impact on days saved and lowered length of stay without dependence on any one variable. Overall, length of stay
was decreased dramatically. The systematic sample demonstrates more dollar specifics on the savings as a direct result of the intervention.

**Study Strengths and Limitations**

This study provides researchers, and hospital leadership, practitioners and staff with a pre and post examination of the palliative intervention and its impact on code status, care levels, hospice use, and cost. The major strength of the study is the large sample of patients \(N=2,920\) examined over the three year period. It is reasonable to conclude that results provide a true representation of patient population. The high number of patients provides a valuable snapshot of diversity in age, race, geographic residence, education level, income and disease. As the medical realm is ever-changing, looking at a three year time period helped to show consistency of services within the intervention.

A second strength of this study is the focus on palliative care conducted in Georgia. This focus not only adds to the literature where it is lacking but also demonstrates the positive impact of a high-volume program in a Georgia hospital serving both rural and urban patients. It is also reasonable to make the claim that the study argues against the low rank on palliative care in this region.

Seen as a third strength, this study highlights an understated public health concern that is the end of life. This includes end-of-life care, disparities and inconsistencies between races and amongst socioeconomic status in end-of-life treatment choices, enhanced quality of life at the end and high end-of-life costs. More specifically, it is reasonable to conclude that the ability to have a meaningful discussion at end of life and to address symptom management offered through the palliative intervention, impacts care level choices and healthcare resources.
As a fourth and final strength of this study, the focus on both racial and socioeconomic variables at the end of life demonstrated the complexity of these decisions, reasonably concluding that one variable alone may not predict an outcome. There are limited white papers on the racial differences, while published data on socioeconomic status impacts are lacking. Therefore, this study expanded the literature specific to variables of geographic measurements, income, education level and race to predict treatment choices.

As with any study, this research was not without limitations. A major limitation of this study was the sole use of data from MCCG, including the medical record and a subsequent footprints data source to define variables. Both the medical record data and footprints data are entered by staff at MCCG. It is possible that measurement bias may have affected some of the data through basic human error. Further, socioeconomic status variables of income and education were not available through the medical record, and therefore geocoding had to be used.

The geocoding process to define socioeconomic variables created a possible limitation. The study was limited to using only addresses that would match a census tract. This excluded patients without a correct street address and those with nursing home or outlying facility addresses. Further, when population based data is gathered by the government, to protect confidentiality, household information is not representative of that one person, but rather the majority in the tract. Individual income and education level cannot be accessed as public information. The census bureau provides averages for the given area and the individual patient information must be inferred. This provides a margin of error and a possible limitation.
Implications for Public Health

This study provides insight into three major areas of public health—enhanced quality of life, racial and socioeconomic disparities, and resource savings in healthcare. Quality of life or quality of death, for the purpose of this study is an area that remains difficult to define. The right-to-die movements highlighted concepts of dignity at the end of life, prolonged deaths and the individual costs associated with life-sustaining technologies (Knaus et al., 1995). What can be concluded from this study specific to the quality of death measurement is that a patient’s care level choices are personal. For some patients, death on artificial support is the appropriate choice while for others a death without aggressive treatments is one that defines quality.

Few studies address racial disparities specific to the end of life (Muni et al., 2011). Likewise, even fewer studies address socioeconomic status as a confounder to racial differences in care choice (Muni et al., 2011). The current research addressed both areas of disparity in public health. This study’s conclusions show increased use of resources by minorities and those with a lower socioeconomic status, which is inconsistent with most disparity research on primary and secondary interventions. This finding is significant to the potential development of any public health education that might be implemented on end-of-life care. Access to life-sustaining interventions at the end of life is not shown to be an issue, but rather possible uninformed decisions for potential over-use of the interventions.

The economics of death, including high healthcare costs at the end of life, are well documented (Zhang et al., 2009). Historical trends for end-of-life spending document the
particularly high costs associated with care in the last year of life (Emanuel & Emanuel, 1994; Luce & Rubenfield, 2002). Perhaps the most significant contribution of this study is the evidence of cost savings through the use of a palliative program, aimed at providing better clinical symptom management and heightened communication services for terminal patients. In a healthcare reform era, the examination of an area which proved to reduce healthcare costs has great implications on public health.

Finally, and more specific to public health in Georgia, is the evidence of a regional facility’s impact on a nationally under-ranked area of medicine. In a recent survey of hospital based palliative programs, Georgia is ranked on the lower end of average, with 20% to 40% of hospitals recorded as having programs (Goldsmith et al., 2008). While many hospitals in Georgia may continue to operate without a program, it is noteworthy to highlight the success of this program and its impact on Georgia patients in both rural and urban areas.

**Suggestions for Future Research**

The palliative intervention is clearly both a quantitative and a qualitative effort. This study only used the quantitative data from pre and post interventions. As a follow-up, a qualitative study looking more closely at the intervention, and focused on geared interdisciplinary efforts and communication, might be worthy of pursuit. The qualitative analysis might include interviews with the counselors who conduct the family conference and practitioners who provide assessment and clinical orders for symptom management. This would add to the content and understanding of this study’s purpose.
A worthy area of focus might also include utilization of active patient subjects for qualitative review of the intervention and for a closer relationship with data. This would also allow the researcher to define socioeconomic status based on the patient’s self-evaluation and to glean some more in-depth understanding surrounding why treatment decisions are made. Further areas of focus might include, a more specific analysis of status changes from I to II and II to III to define specific de-escalation of care, a more in-depth categorization of primary disease condition to improve understanding of the complexities of the patient’s illness, and an expansion of race categories to include other minority patients like Hispanic and Asian. Further, a worthy study may focus on other hospitals in the area to help and expand understanding of the palliative intervention and its regional impact.

Finally, palliative care is a young area, and further investigation is needed to better this study, and future studies are recommended.
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APPENDIX A

IRB APPROVAL LETTER

Georgia Southern University
Office of Research Services & Sponsored Programs
Institutional Review Board (IRB)

Telephone: 912-478-5465
Fax: 912-478-0719

To: Kathleen Benton
James Stephens
Jiann-Ping Hsu College of Public Health

Ce: Charles E. Patterson
Vice President for Research and Dean of the Graduate College

From: Office of Research Services and Sponsored Programs
Administrative Support Office for Research Oversight Committees
(IACUC/IBC/IRB)

Date: July 26, 2011
Expiration Date: December 31, 2011

Subject: Status of Research Study Modification Request

After a review of your Research Study Modification Request on research project numbered H11439 and titled “An Examination of the Influence of Socioeconomic Status and Race on End of Life Treatment Level Following a Palliative Intervention,” your request for modification appears that (1) the research subjects are at minimal risk, (2) appropriate safeguards are planned, and (3) the research activities involve only procedures which are allowable.

Therefore, as authorized in the Federal Policy for the Protection of Human Subjects, I am pleased to notify you that the Institutional Review Board has approved your modification request to modify the title, study variables, hypothesis and waiver of authorization.

The expiration date of your original application approval remains in effect. If additional time beyond your expiration date is required to complete your data collection and analysis and there have been no further changes to the research protocol; you may request an extension of the approval period. If your project will require approval beyond 36 months from the initial approval date, a new submission and review will be required. In the interim, please provide the IRB with any information concerning any significant adverse event, whether or not it is believed to be related to the study, within five working days of the event. In addition, another change or modification of the approved methodology becomes necessary; you must notify the IRB Coordinator prior to initiating any such changes or modifications. At that time, an amended application for IRB approval may be submitted. Upon completion of your data collection, you are required to complete a Research Study Termination form to provide the final information to allow your file to be closed.

Sincerely,

Eleanor Haynes
Compliance Officer


### APPENDIX B

### PROJECT TIMELINE

<table>
<thead>
<tr>
<th>Objective</th>
<th>Date of Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop prospectus</td>
<td>C 4-Apr-2011</td>
</tr>
<tr>
<td>Submit prospectus to Chair</td>
<td>C 4-Apr-2011</td>
</tr>
<tr>
<td>Submit Candidacy Exam Report Form</td>
<td>C Mar-1-2011</td>
</tr>
<tr>
<td>Establish Dissertation Committee</td>
<td>C 1-Mar-2011</td>
</tr>
<tr>
<td>Submit DrPH Candidacy Recommendation Form</td>
<td>C 22-Apr-2011</td>
</tr>
<tr>
<td>Complete revisions from Chair</td>
<td>C 22-Apr-2011</td>
</tr>
<tr>
<td>Submit prospectus document to other committee members</td>
<td>C 30-Jun-2011</td>
</tr>
<tr>
<td>Complete revisions from Committee members.</td>
<td></td>
</tr>
</tbody>
</table>

*Final date to apply for December 2011 graduation*                        | 22-Aug-2011        |

| Schedule prospectus defense.                                             | C Jun-2011         |
| Defend and pass prospectus defense.                                      | C 25-July-2011     |
| Submit Doctoral Prospectus Defense Report Form                           | C 27-July-2011     |
| Obtain IRB approval                                                      | Completed          |
| Meet with Dr. Vogel to finalize research findings                        | C 30-Aug-2011      |
| Write chapter 4-5                                                       | C 1-Sep-2011       |
| Submit dissertation document to committee members                       | C 23-Sep-2011      |
| Submit defense Announcement and Scheduling Form                          | 6-Oct-2011         |
| Complete revisions from committee                                        | 7-Oct-2011         |
| Obtain approval from Chair to schedule final defense and submit form    | 10-Oct-2011        |
| Schedule defense                                                        | 12-Oct-2011        |
| Revise dissertation                                                     | 24-Oct-2011        |
| Submit revised draft                                                    | 26-Oct-2011        |
| Final day to hold dissertation defense                                   | Nov-2011           |
| Submit ETD release options form                                          | 19-Oct-2011        |
| Submit final dissertation to UMI and COGS                                | 30-Oct-2011        |
| Submit DrPH Completion form                                              | 30-Oct-2011        |
APPENDIX C

SECONDARY DATA AGREEMENT

Letter of Cooperation for Data Collection

April 28, 2011

Institutional Review Board
Georgia Southern University
P.O. Box 8005
Statesboro, GA 30461

To Whom It May Concern:

Kathleen Benton has requested permission to collect research data from the Transitions Palliative Care Program at The Medical Center of Central Georgia in Macon, Georgia through a project entitled “An outcome evaluation of the transitions palliative care program and end-of-life care in African American patients.” I have been informed of the purposes of the study and the nature of the research procedures. I have also been given an opportunity to ask questions of the researcher.

The data requested, including access to patient charts and data from palliative consults recorded in the footprints program, will be provided by a facility member, made available through access to patient charts, and patients in clinical setting from February 1, 2011 until deemed necessary.

This Data Use Agreement is made and entered into on February 1, 2011 by and between Carol Babcock, hereafter “Holder” and Kathleen Benton, hereafter “Recipient.”

1. This agreement sets forth the terms and conditions pursuant to which Holder will disclose a Limited Data Set to the Recipient.
2. Terms used, but not otherwise defined, in the Agreement shall have the meaning given the terms in the HIPAA Regulations at 45 CFR Part 160-164. Permitted Uses and Disclosures
3. Except as otherwise specified herein, Recipient may make all uses of the Limited Data Set necessary to conduct the research study entitled above
3.1. The Recipient agrees not to disclose or otherwise provide access to the Limited Data Set to other individuals outside the Recipient’s study committee. If such disclosure is deemed necessary by the Recipient in pursuit of this research project, additional and/or supplementary Data Sharing Agreements will be negotiated prior to any such disclosure.
3.2. The Recipient agrees to use appropriate safeguards to protect data received from the Holder
3.3. The Recipient agrees to report immediately any unauthorized use or disclosure of data received from the Holder
3.4. The Recipient agrees that all personnel involved in the study and who have authorized access to the data are fully aware of and will comply with terms within this agreement
3.5. The Recipient agrees not to identify the data or attempt to contact the subject(s)
3.6. For the purpose of data use preparatory to research, Protected Health Information (PHI) shall not be transferred outside of the Covered Entity (The Medical Center of Central Georgia) or to any non-MCGC owned devices or networks.
4. Term and Termination: The terms of this agreement shall be effective upon signing this agreement and shall remain in effect until all information in the data set provided by the recipient is either destroyed or returned to the Holder
5. General Provisions
5.1. Each party agrees that it will be responsible for its own acts and the results thereof to the extent authorized by law and shall not be responsible for the acts of the other party or the results thereof
S.2. Recipient and Holder understand and agree that any scholarly report, publication, professional presentation, abstract, etc., resulting from the research will include, as coauthors, the Recipient, the Recipient's committee and the Holder.

As a representative of the Medical Center of Central Georgia I am authorized to grant permission to have the researcher utilize our data both at our facility and through the infusion of the Limited Data Set to the researcher's private computer. I will also allow the researcher to collaborate with members of the personnel of this study to collaborate during the analysis portion of this study. All review of data is considered predatory for research feasibility, prior to actual research, the project must be reviewed and approved by the Medical Center of Central Georgia Institutional Review Board.

Sincerely,

Bernard Meyer von Bremen, Pharm. D.
Institutional Review Board, Chair
The Medical Center of Central Georgia
777 Hemlock Street
MSC 113
Macon, GA 31201

C: Kathleen Bento, Doctoral Candidate
Jiann Ping Hsu College of Public Health at Georgia Southern University

Carol Babcock, RN
Program Manager
Palliative Care
MCCG