

DETERMINANTS OF MENTAL HEALTH UTILIZATION IN
A PALLIATIVE CARE OUTPATIENT
SETTING

by

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ABSTRACT

This study examines the determinants of psychology service utilization among a chronically ill population. Data were combined from an outpatient palliative care clinic using two patient outcome studies for a secondary data analysis. Overall, 149 patients were examined with the majority being middle-aged ($M = 55$, $SD = 14.73$), female ($n=112$; 75.2%) and White ($n=123$; 82.6%) with a primary diagnosis of cancer ($n=117$; 78.5%) over a 37 month time period. Using the Behavioral Model of Health Service Use (Andersen, 1995), separate logistic regression analyses were conducted to assess for significant predisposing, enabling and need factor determinants of psychology service utilization in outpatient palliative care. The significant determinants from each of these factors were then modeled together. The total number of visits to see a palliative care physician was found to be the strongest determinant of psychology service utilization ($p < .001$). Seeing multiple providers was also a statistically significant determinant of psychology service utilization ($p = .002$) as well as not taking a non-opioid analgesic ($p = .024$). These findings suggest enabling factors from Andersen's model are most strongly associated with psychology service utilization in outpatient palliative care populations. Of note, many factors associated with need for psychology services, such as emotional distress, psychological symptom burden or having a psychological comorbidity, did not reach significance in determining psychology service use. These findings reinforce previous research that indicates chronically ill individuals are not likely to receive mental health care even though it is documented that they have increased distress related to their mental health. Also, these

findings indicate the need for further investigation as to who is receiving referrals for psychology services, as it is noted in the scientific literature that many chronically ill individuals are under-recognized as needing mental health care referrals by their physicians.

LIST OF ABBREVIATIONS AND SYMBOLS

<i>a</i>	Cronbach's index of internal consistency
<i>BMI</i>	Body Mass Index
<i>BPI</i>	Brief Pain Inventory: consists of a pain interference subscale and pain intensity subscale
<i>CPSC</i>	Center for Palliative and Supportive Care
<i>DSM-IV</i>	Diagnostic and Statistical Manual Fourth Edition
=	Equal to
≥	Greater than or equal to
<i>ICC</i>	Intraclass correlation coefficient
<i>IRB</i>	Institutional Review Board
<	Less than
≤	Less than or equal to
<i>M</i>	Mean: the sum of a set of measurements divided by the number of measurements in the set
<i>MQOL</i>	McGill Quality of Life measure
<i>MDASI</i>	MD Anderson Symptom Burden Inventory
<i>NCCN</i>	National Comprehensive Cancer Network
<i>p</i>	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
<i>PHQ</i>	Patient Health Questionnaire which includes two subscales: depression and generalized anxiety. Based on the Diagnostic and Statistical Manual Fourth Edition

<i>r</i>	Pearson product-moment correlation
<i>SCID</i>	Structural Clinical Interview
<i>SD</i>	Standard Deviation
<i>Tol</i>	Tolerance
<i>UAB</i>	University of Alabama at Birmingham

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CHAPTER 1: INTRODUCTION

In 2004, almost half of all Americans, or 133 million people, were living with a chronic condition and projections indicate this number will increase by more than 1% each year until 2030 (Wu & Green, 2000). In 2001, 24 % of all Americans had two or more chronic conditions. Eighty-one percent of people with serious chronic conditions see two or more different physicians annually (Anderson, 2004). Depressive and other psychological disorders assume an important role in the etiology, course, and outcomes associated with chronic disease (Chapman, 2005; Trask, 2002). The current prevalence estimate is that about 25% of the United States (U.S.) population is affected by mental disorders during a given year (Kessler, 2003). Increased recognition of the high comorbidity of depression and chronic conditions (Solano, 2006), such as the link between depression and anxiety with hypertension (*Depression and anxiety linked to hypertension*, 2000; Scherrer, 2003), has led to the development of integrated mental health programs that incorporate mental health screening (Scogin & Shah, 2006) and services into care settings treating individuals living with chronic conditions. Collaborative care (Scherrer, 2003) is an approach in which physicians and mental health providers collaborate in an organized way to manage common mental disorders. Such programs are pragmatic and apply principles of chronic disease management, including establishing and sustaining effective communication and collaboration between primary care, mental health providers, and care managers. This collaboration may support systematic diagnosis, outcomes tracking and facilitate adjustment of treatments based on clinical outcomes (stepped care) (Scogin, Hanson, & Welsh, 2003; Thielke, 2007).

Palliative and Supportive Care

As defined by the National Comprehensive Cancer Network (NCCN, 2010), palliative care is a structured system of delivering care to individuals with life-threatening or debilitating illness. Its focus is on effective management of pain and other distressing symptoms, while incorporating psychosocial and spiritual care according to patient/family needs, values, beliefs and cultures. Therefore, by definition, palliative care should employ a multidisciplinary approach to treatment in order to meet all aspects of patient's needs. The University of Alabama at Birmingham's (UAB) outpatient Center for Palliative and Supportive Care (CPSC) clinic is based within the collaborative model in which mental health providers (psychologists) and physicians (along with other specialties) work together to strategize, implement and evaluate patient's treatment course.

As a new medical profession, palliative care is often misunderstood and therefore underutilized by referring physicians and/or the general population (Koffman, 2007). These misunderstandings are sometimes perpetuated by cultural stigma surrounding death and dying. Similarly, general mental health service utilization suffers from misinformation, lack of information and cultural stigma which can lead to underutilization. With that, it has been found that younger Non-Hispanic women tend to use palliative medicine and mental health services more frequently than other groups (Koffman, 2007; Reeve, 2008).

In spite of the NCCN guidelines specifying the psychosocial role of palliative care and its similar struggles in up-take to mental health care, many psychological disorders, especially depression (Han, 2011; Harris, 2005), have been unrecognized or under-treated within palliative care settings (Stiefel, 2001).

Outpatient treatment providers in the UAB CPSC have been tracking clinical outcomes for four years with the goals of improving treatment quality and disseminating information about outpatient palliative care through research scholarship. Most of the palliative care outpatients have a cancer diagnosis, are often receiving concurrent oncological treatment and present for care related to symptom management (e.g., pain, fatigue, etc), psychological treatment, and goals of care determination (e.g., clarifying goals and priorities with the physician as they move across the trajectory from curative, palliative and terminal). The remaining outpatients have advanced, life-threatening diseases, such as late-stage lung, heart, or neurological illness.

Cancer

Referrals to palliative care among cancer patients are most often related to their complex disease trajectory and the need for supportive treatment across the disease spectrum. The need for supportive treatment is credited to the fact that, in addition to physical suffering, psychological comorbidities are increasingly recognized as major components of distress (Kadan-Lottick, Vanderwerker, Block, Zhang, & Prigerson, 2005). Several factors contribute to psychological distress in individuals with cancer (Block, 2000), including the grief about current and anticipated losses, fear of death, concerns about loved ones, the effect of certain chemotherapeutic drugs on mood (Besisik, 2003; Geinitz, 2004; Ito, 2003; Massie, 2004), and the biology of the malignancy (Green, 1993).

Kadan-Lottick et al. (2005) found that 12% of terminal cancer patients met criteria for a major psychiatric condition, a statistic similar to the general population (U.S. Surgeon General's Office, 1999). According to self-report, 28% accessed a mental health intervention for a psychiatric illness since the cancer diagnosis, 17% had discussions with a mental health professional and 90% were willing to receive treatment for emotional problems. Mental health

services were not accessed by 55% of patients with major psychiatric disorders as determined by the Structured Clinical Interview for the DSM-IV (SCID) (First, 1995). Cancer patients that discussed psychological concerns with mental health staff and Non-Hispanic white patients were more likely to receive mental health services (Kadan-Lottick, et al., 2005).

Although psychiatric disorders in cancer patients are highly treatable (Akechi, 2010; Breitbart & Jacobsen, 1996), studies suggest that healthcare providers do not adequately address mental illness in this population (Fisch, 2003). Ford et al. (1996) audio-taped patient-doctor outpatient clinic encounters for 117 patients who received “bad news” about a cancer diagnosis at a tertiary care center. Although patients spent 14% of the time talking about, and giving information on their psychosocial concerns, clinicians only devoted 3% of their verbalizations to addressing them. In a large study of 1,109 cancer patients, oncologists were concordant with patient-completed scales of depression in only 13% of patients reporting the severe range of symptoms (Passik, 1998). In the same study sample, nurses tended to under recognize severe depressive symptoms at similar rates (McDonald, 1999).

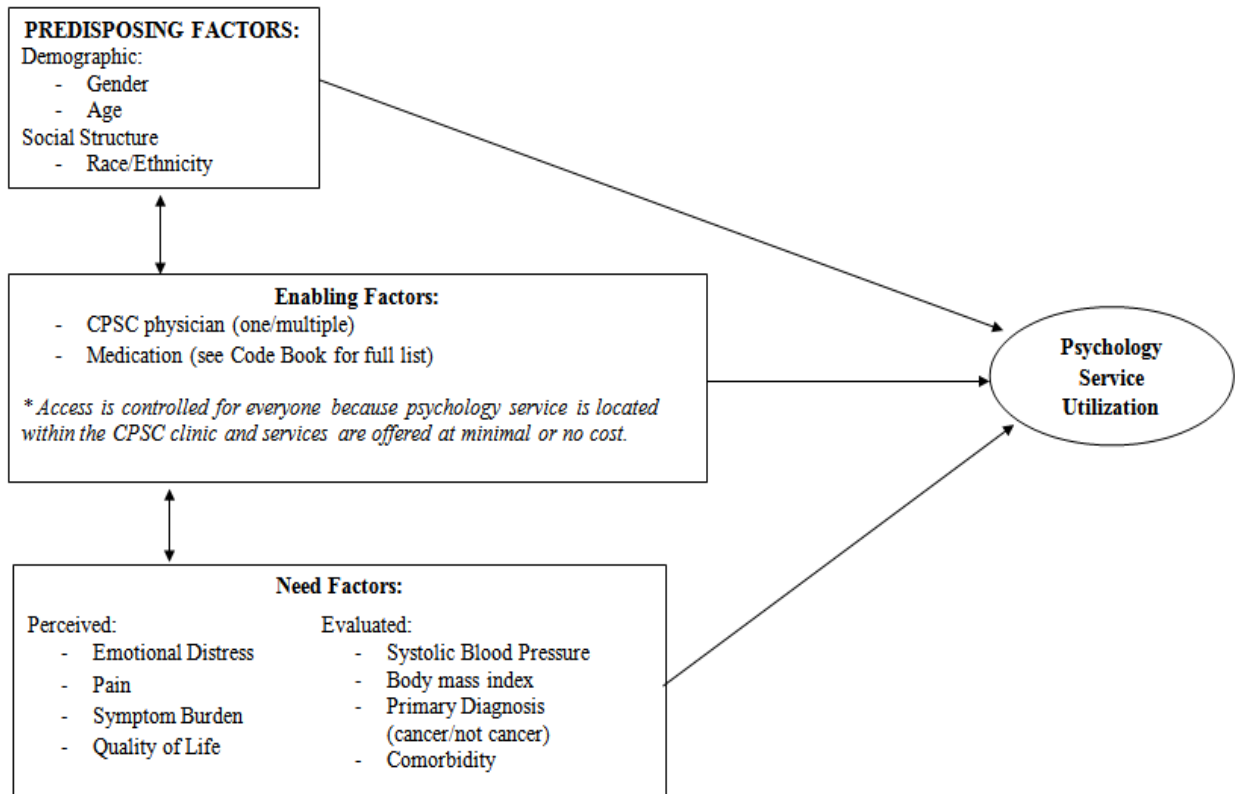
Untreated psychological distress in cancer patients is associated with amplified pain (Passik, 1998), increased desire for hastened death (Breitbart, et al., 2000), increased disability (Portenoy, 1994), impaired ability to participate in end-of-life planning (Block, 2000), and diminished psychosocial functioning of caregivers (Ballenger, 2001). With this, understanding utilization patterns of mental health care is critical to increasing the likelihood that cancer patients in psychological distress receive the mental health treatment they need.

Conceptual Framework

This secondary data analysis using the CPSC outcomes study data is informed by Anderson’s Behavioral Model of Health Service Use (Andersen, 1995), which incorporates three

main components in the framework: predisposing, enabling, and need factors. These factors suggest that an individual's use of psychology services is a function of his or her predisposition to use services, factors which enable or impede use, and their overall need for care (Andersen, 1995).

Figure 1.1: Conceptual Framework
Adapted from Anderson's Behavioral Model (Andersen & Newman, 1995; Roche, 2012)



With the limitations of secondary data analysis, all components of Anderson's behavioral model were not measured in the current study; however, many were and are displayed in Figure 1.1. Predisposing characteristics include demographic components (age and gender) and social structure components (race/ethnicity). Typically information such as income and educational attainment is also a component of understanding an individual's predisposing social characteristics (Andersen & Newman, 2005); however, this information was not collected in this sample.

Enabling factors are associated with factors external to the individual patient that affect their utilization of psychology services. Within the context of UAB's CPSC outpatient clinic, physicians are the gatekeepers to identifying and referring patients to their psychology service. Therefore the CPSC physician was assessed in order to capture the enabling factors that hinder or enhance an individual's likelihood to utilize psychology services. The clinic schedules a psychologist to be present during their weekly clinics to ensure their availability for consultation. All subsequent psychology service visits are offered by a psychologist in the clinic where the CPSC outpatient visits take place. Also, patients do not pay a separate charge for psychology services. They are asked to pay a nominal co-pay (\$2.00 for the period these data were collected), but that is waived if patients indicate a difficulty to pay. Access to care is thereby controlled with all study participants because they have the same level of physical and financial access to psychology services. Other desired but unavailable information in this dataset includes whether or not the participants are insured and the type of insurance they have. The current medications taken by the participants were also included as enabling factors. Medications of particular interest for enabling psychological services utilization are those related to their mood and anxiety (e.g., SSRI's, benzodiazepines, anti-psychotics, etc.) as well as medications related to pain (e.g., opioid, non-opioid, etc.) and somatization related medications (muscle relaxants) were included in the model.

Lastly, need factors may be perceived by the individual or evaluated by the health care professional. Unfortunately, referral by the physician was not assessed and therefore is not included in this secondary analysis of determinants to psychology service utilization. Perceived need factors were reported by the patient, including measures of emotional distress (depression and anxiety), pain, symptom burden and quality of life. In this study, perceived need factors

measure the emotional distress patients at the CPSC may have experienced that led to utilization of psychology services. The evaluated need variables included in this study are: systolic blood pressure, BMI, primary diagnosis and comorbidities.

Specific Aims and Hypotheses

The aim of this study is to examine the determinants of utilization of psychology services by UAB CPSC outpatients. The purpose of understanding such determinants is to guide knowledge and future interventions toward increasing the likelihood that these patients, which are at higher risk for comorbid psychological disorders, are being identified, referred to psychology services and engaged in utilizing these services.

In concordance with Figure 1.1, the researchers hypothesized that the predisposing factors of younger age, being White and female would increase the likelihood that an individual would utilize psychology services. The enabling factors associated with increased psychology service utilization were seeing multiple providers and taking psychotropic, opioid analgesics, non-opioid analgesics, or muscle relaxant medications. The perceived need factors hypothesized to increase psychology service utilization were increased levels of emotional distress, psychological symptom burden, pain intrusiveness and pain intensity, and lower levels of quality of life. It was hypothesized that increased systolic blood pressure, lower BMI, as well as a cancer diagnosis, comorbid psychological disorder diagnosis or possible somatic disorder diagnosis (e.g., GI tract-related illness, IBS, weight-related disorder or sleep-related disorder, etc.) would be associated with increased likelihood that an individual would utilize psychological services.

CHAPTER 2: METHODOLOGY

Since 2006, UAB's two outpatient palliative care physicians have administered outcome measures including the Brief Pain Inventory (Cleeland, 1989), the Patient Health Questionnaire (Kroenke, 2001), the Generalized Anxiety Disorder questionnaire (Spitzer, Kroenke, Williams, & Lowe, 2006), the McGill Quality of Life measure (Cohen, Mount, Strobel, & Bui, 1995) and the MD Anderson Symptom Assessment Inventory (Cleeland, et al., 2000) to assess patient perceptions of quality of care (continuous quality assurance). This secondary data analysis used data from individuals who began treatment after the complete questionnaire packet had been introduced in late 2006 (Pullins, et al., 2010).

From the outset, outcomes measurement in UAB's CPSC outpatient clinic was designed to be longitudinal. Patients complete questionnaire packets at each appointment, facilitating examination of how symptoms change over time (Pullins, et al., 2010).

Participants

Data for this study included two datasets merged from two studies conducted with outpatients at UAB's palliative care outpatient clinic. The CPSC clinic serves individuals in need of supportive, palliative medical treatment in an outpatient setting. The first dataset includes data collected retrospectively by master's students from the UAB School of Public Health between August 2008 and September 2008, and is composed of various items from clinical charts recorded between January 2006 and June 2008. Data from a total of 116 individuals (489 CPSC clinician visits) were extracted from the charts. The purpose of collecting these data was to

improve treatment delivery for individuals receiving palliative care. All instruments were completed on a paper form distributed when the patient checked in for his or her appointment. Chart data were extracted for the patients who were seen at least once for clinical visits with a CPSC physician and who provided consent for their outcomes data to be monitored.

The second dataset was collected in a study designed to assess the feasibility and validity of patients filling out the standard clinic instruments on the computer instead of on paper. These data were collected between August 2008 and March 2009. Outpatients (n=60) were randomized to paper or computer instrument completion. For all subsequent follow-up visits, these patients completed the instruments depending on the method they preferred. For each participant, the start point for data collection was the visit in which the patient was recruited and then data were collected for all subsequent visits during the study period. The dataset collected data of 152 palliative care outpatient clinic visits. The variables included in this second dataset were the same as in the retrospective dataset.

Although the data collection periods for each dataset are different, some patients provided data for both datasets. Therefore, when merging the datasets, all participants that were duplicated in the two datasets were merged into the new dataset with all data incorporated as separate, additional time points. The numbers of psychology services utilized for the participants across the two studies were summed into one total. This was appropriate because the two studies do not overlap in data collection periods, so even though a participant might be included in both datasets, the psychology service visits were not duplicated.

Permission to use outpatients' clinical information for research purposes was obtained from the UAB's Institutional Review Board (IRB) prior to undertaking data collection efforts.

Permission was granted by the University of Alabama's IRB to conduct a secondary data analysis on these data for a master's thesis.

Measures

Patient characteristics

Each dataset included patient age, race/ethnicity, and gender. Gender was coded as "0" for male and "1" for female. Race/ethnicity was coded as "0" for White, "1" for Non-White. The patient's primary diagnosis was categorized dichotomously with "0" indicating a non-cancer diagnosis and "1" indicating a cancer diagnosis. Other patient information included in the analysis was patient comorbidities and medications (see Appendix for a complete comorbidity and medication list in the Code Book) which were also categorized dichotomously (i.e., "0"= no psychological comorbid disorder, "1" = psychological comorbid disorder [for each comorbidity]; "0"= no opioid use, "1"=opioid use [for each medication]). Body mass index (BMI) and systolic blood pressure (i.e., physical health information) were included as continuous variables. Responses to standard clinic instruments (questionnaires) on pain, quality of life, anxiety, and depression were scored and the overall score, as well as applicable subscale scores, were included in the dataset. For the MD Anderson Symptom Assessment Inventory, each symptom was a measure in and of itself (0-10 rating). From this scale, each participant also received a psychological burden score, which is an average score of all of the burden ratings of the psychological symptoms. They also were given a physical burden score, which was an average score of the ratings of burden of their physical symptoms. Also, the Patient Health Questionnaire (PHQ-9) and General Anxiety Disorder (GAD-7) scale scores were combined to create an emotional distress score.

The primary outcome variable, psychology service utilization, was collected differently across the 2 studies. In the prospective study, psychology service utilization was captured by counting and recording the total number of consultations given to the patient between each of the data time points. However, in the retrospective study, the sums of all psychological consultations across the entire study were recorded and did not correspond with the assessments taken during their CPSC physician visits. Therefore, after the data were merged, a total number of psychology visits across the entire data collection period was created.

Anxiety: Generalized Anxiety Disorder 7-item (GAD-7) Scale

The Generalized Anxiety Disorder questionnaire (GAD-7) (Spitzer, Kroenke, Williams, & Lowe, 2006) was used to assess patient's anxiety level. The GAD-7 scale scores range from 0 to 21 where each of the seven items is scored from 0 to 3. The internal consistency of the GAD-7 is excellent (Cronbach's $\alpha = .92$). Test-retest reliability is also good (intraclass correlation coefficient [ICC] = 0.83). Comparison of scores derived from the self-report scales with those derived from the mental health practitioner-administered version of the same scales yielded similar results (ICC=0.83), indicating good procedural validity.

A score of 10 or greater on the GAD-7 represents a reasonable cut point for identifying cases of Generalized Anxiety Disorder (GAD). Cut points of 5, 10, and 15 might be interpreted as representing mild, moderate, and severe levels of anxiety on the GAD-7, similar to levels of depression on the PHQ-9 (Spitzer, et al., 2006).

Depression: Patient Health Questionnaire (PHQ-9)

The Patient Health Questionnaire (PHQ-9) (Kroenke, 2001) is a nine item depression scale that was used to assess patient's depression. The PHQ-9 is a tool for assisting clinicians in diagnosing depression as well as selecting and monitoring treatment. There are two components

of the PHQ-9, assessing symptoms and functional impairment to make a tentative depression diagnosis and deriving a severity score to help select and monitor treatment. The PHQ-9 is based directly on the diagnostic criteria for major depressive disorder in the Diagnostic and Statistical Manual Fourth Edition (DSM-IV).

The internal reliability of the PHQ-9 was excellent in the PHQ Primary Care Study (Cronbach's $\alpha = 0.89$) (Spitzer, Kroenke, & Williams, 1999) and in the PHQ OB-GYN Study (Cronbach's $\alpha = 0.86$) (Spitzer, Williams, Kroenke, Hornyak, & McMurry, 2000). Test-retest reliability of this scale was also excellent. Correlation between the completed PHQ-9 assessment in the clinic and that administered by telephone by the mental health practitioner within 48 hours was 0.84, and the mean scores were nearly identical (5.08 vs. 5.03). Scores of 5, 10, 15, and 20 represent thresholds demarcating the lower limits of mild, moderate, moderately severe and severe depression, respectively (Kroenke, 2001).

Quality of Life: McGill (*Revised*), MQOL

The McGill Quality of Life measure (MQOL) (Cohen, Mount, Strobel, & Bui, 1995) was used to assess patient's quality of life. It is a patient-reported instrument that has 16 items plus a single-item global scale, each with a 2-day time frame. In addition, the MQOL contains five domains (physical well-being, physical symptoms, psychological, existential, and support) and each of the domains is scored as a separate subscale. An overall index score can be calculated from the means of the five subscales. The single-item global quality of life scale is included as a validity variable but also can be used in conjunction with the overall MQOL and subscale scores.

The instrument was designed to be general in nature to maintain brevity and assure applicability to all patients. For example, instead of asking about a long list of symptoms, respondents are asked to list the three symptoms that are the most problematic and then to rate

those three symptoms for severity. Each question uses a 0-10 scale with anchors at each end (Cohen, et al., 1995).

The internal consistency of the MQOL 16-item instrument (does not include the single-item rating) and the subscales was examined and found to be good (Cohen, et al., 1997). The total scale score contains sixteen items and the overall Cronbach's $\alpha = 0.83$. The test-retest reliability and the ICCs among oncology patients were found to be in the medium range ($r = 0.69$ to 0.78) (Cohen & Mount, 2000).

Responsiveness to change over time was tested among oncology patients by asking them to rank their days as good, average, or bad (Cohen & Mount, 2000). Analysis of variance tests (ANOVA) show a significant difference between types of days for the total MQOL ($r = 0.66$).

The strongest evidence of validity comes from comparison with the single-item quality of life measure. Correlation with the single-item quality of life (measured after completing the full questionnaires) was high with the MQOL total ($r = 0.66$) (Cohen & Mount, 2000).

Symptom Burden: MD Anderson Symptom Assessment Inventory

The MD Anderson Symptom Burdon Inventory (MDASI) (Cleeland, 2000) is designed to assess experienced symptoms in cancer patients; however, all CPSC patients were administered this assessment regardless of diagnosis. It consists of 10 core symptom items that are rated based on their presence and severity and 6 symptom interference items that are rated based on the level of symptom interference with function. Scores ≥ 7 are considered severe.

The validation study demonstrated that reasonably small numbers of symptom items can account for the majority of symptom distress in patients with different malignancies at various stages and that these items are sensitive to expected differences in symptoms and side effects. Both the symptom severity scales and the symptom interference scale of the MDASI show the

predicted relations with disease severity. In addition, the MDASI is highly correlated with independent indicators of disease and treatment severity. The factor structure obtained from the initial outpatient sample was replicated in a cross validation sample of outpatients. The internal consistency of the symptom scales and the symptom interference scale is high (Cleeland, et al., 2000).

Pain: The Brief Pain Inventory

The 16-item Brief Pain Inventory (BPI) (Cleeland, 1989) was used to measure pain. The BPI includes questions in which patients rate their worst, least, average, and current pain intensity on a scale of 0 (“no pain”) to 10 (“pain as bad as you can imagine”). Patients also rate the degree to which pain causes interference across seven domains (e.g., mood, walking ability) on a scale of 0 (“does not interfere”) to 10 (“completely interferes”). Subscales on the BPI include Pain Intensity (the average of the four pain intensity items) and Pain Interference (the average of the seven pain interference items). Pain intensity and pain interference scores are continuous and range from 0 to 10; 0 represents no intensity or interference and 10 represents the greatest degree of intensity or interference (Cleeland, 1989).

Data Analysis

Following the conceptual model (Figure 1.1), the main purpose of the statistical analyses was to model psychology service utilization using the predisposing factors (race/ethnicity and age), enabling factors (CPSC physician and medication use), and need factors (primary diagnosis, comorbidity, BMI, systolic blood pressure, depression, pain, quality of life, anxiety, and symptom burden) as explanatory variables. Because the datasets for this proposal include outpatient data collected over a combined period of 37 months, individuals might have been assessed several times during the data collection period. In the retrospective dataset, there is an

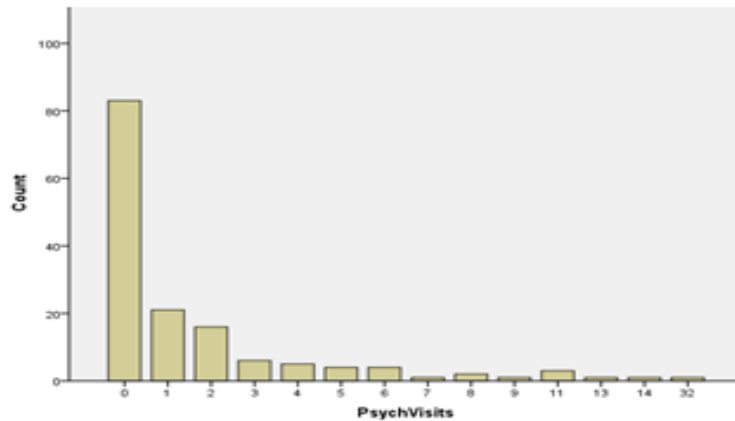
average of 4.2 palliative care appointments per individual; in the prospective dataset, there is an average of 2.5 palliative care appointments per individual, for a combined average of 4.3 palliative care appointments per individual.

To understand the determinants to psychology service utilization, the distribution of these data was examined because the frequency of the outcome variable (number of psychology visits) indicated that there were many individuals that did not utilize the services at all (n= 83 (55.7%)). Table 2.1 illustrates the analysis of data skewness. According to Pedhazur (1997), if the skewness of the data is more than two times as large as the standard error of skewness measure, the data violate the assumption of normality. In this sample, the standard error is 0.199 and the skewness statistic is 4.671 indicating a non-normal distribution.

<i>Standard Error</i>	<i>Skewness Statistic</i>
0.199	4.671

The distribution is further illustrated by a histogram in Figure 2.1 that shows the positively skewed distribution of these data. Therefore, multivariate regression techniques were deemed not appropriate for this sample because these techniques are based on the assumption of a normal distribution.

Figure 2.1: Histogram of Psychology Visit (continuous) Distribution



Due to the nature of this distribution (See Figure 2.1), psychology service utilization was modeled as a binary variable (yes/no). In a cross-sectional context, a commonly used statistical technique that allows estimation of regression-type models with binary outcomes is logistic regression, the analytic approach used here.

The total number of CPSC visits was highly predictive of psychology service utilization. In order to control for this exposure effect, CPSC total visits was included in each of the three logistic regression models. Each factor was examined in a separate model, as opposed to a hierarchical design, due to the number of variables being assessed. The first of these models included the predisposing factors (age, race and sex). The second logistic regression modeled the proposed enabling factors (physician and medications). The third model examined both the perceived and evaluated need factors. A final full model included all of the variables from each model that reached a significant level of $p \leq .05$.

In order to decrease the amount of multicollinearity, a comparison analysis was conducted which eliminated variables based on their tolerance levels. One model that included all three of the Andersen behavioral model factor's variables was assessed and at each iteration the variable with the lowest tolerance score was removed and the model was rerun until all

variables included in the model were above the tolerance cut-point ($Tol = .04$) (Pedhazur, 1997). The findings from this comparison model were equivalent to those found in the initial model.

From the outset, outcomes measurement in UAB's CPSC was designed to be longitudinal. Researchers in these settings must often contend with missing data (e.g., due to missed appointments or patient frailty), patient attrition, and widely varying intervals between clinical appointments (Pullins, et al., 2010). In order to combat the problem of missing data, linear interpolation (LERP) was used to replace missing values. Kang (2011) demonstrated that LERP works well, whereas other existing methods fail to perform properly, when data contain a high proportion of missing values and/or strong correlation across cross-sectional units.

CHAPTER 3: RESULTS

As summarized in Table 3.1, there were 149 participants with the majority being middle-aged ($M = 55$, 21-98, $SD = 14.73$), female ($n=112$; 75.2%) and white ($n=123$; 82.6%) with a primary diagnosis of cancer ($n=117$; 78.5%). Overall the sample had a mean of 4.30 (1-21, $SD=3.84$) total appointments with their CPSC physician and a mean of 1.74 (0-32) psychology service visits. Their mean depression score was in the moderate depression score range ($M = 11.72$, $SD = 6.87$) and their mean anxiety scores were in the mild anxiety range ($M = 8.99$, $SD = 6.33$). Overall, this sample had moderate levels of pain intrusiveness ($M = 5.09$, $SD = 3.24$) and severity ($M = 8.99$, $SD = 6.33$) and their BMIs were in the upper-normal range ($M = 25.33$, $SD = 6.11$).

As displayed in Table 3.2, the first logistic regression included the predisposing factors and total number of CPSC visits regressed on presence of psychology service visits. The significant determinants in this model were, total CPSC appointments ($p < .001$) and younger age ($p = .030$).

The second model examined the enabling factors and is displayed in Table 3.3. The total number of CPSC visits ($p < .001$), seeing multiple providers ($p = .001$) and not taking a non-opioid analgesic ($p = .042$) were significant determinants of psychology service use.

Table 3.1: Participant Characteristics (N = 149)

		<i>N (%)</i>
Gender	<i>Female</i>	112 (75.2)
Race/Ethnicity	<i>White</i>	123 (82.6)
Primary Cancer Diagnosis		117 (78.5)
Psychology Service Visits	<i>No</i>	83 (55.7%)
Antidepressant Medication	<i>Yes</i>	95 (63.8 %)
Anticonvulsant Medication	<i>Yes</i>	41 (27.5%)
Anxiolytic/hypnotic Medication	<i>Yes</i>	79 (53.0%)
Muscle Relaxant Medication	<i>Yes</i>	17 (11.4%)
Non-opioid Medication	<i>Yes</i>	28 (18.8%)
Opioid Medication	<i>Yes</i>	100 (67.1%)
Psychological Comorbidity	<i>Yes</i>	110 (73.8%)
Pain Comorbidity	<i>Yes</i>	43 (28.9%)
Sleep-related Comorbidity	<i>Yes</i>	32 (21.5%)
Weight-related Comorbidity	<i>Yes</i>	13 (8.7%)
Gastrointestinal Tract Disorder Comorbidity	<i>Yes</i>	56 (37.6%)
Reproductive Tract Disorder Comorbidity	<i>Yes</i>	17 (11.4%)
Irritable Bowel Syndrome	<i>Yes</i>	10 (6.7%)
Pancreas/Gall Bladder/Kidney Disease Comorbidity	<i>Yes</i>	30 (20.1%)
		<i>Mean (SD)</i>
Mean Age		55.01 (14.73)
Mean Total CPSC Visits		4.30 (3.84)
Mean BMI		25.33 (6.11)
Mean Depression (PHQ-9)		11.72 (6.87)
Mean Anxiety (GAD-7)		8.99 (6.33)
Mean Psychological Burden (MDASI)		4.45 (3.04)
Mean Physical Symptom Burden (MDASI)		4.07 (1.91)
Mean Pain Intrusiveness (BPI)		5.09 (3.24)
Mean Pain Severity (BPI)		4.70 (2.63)
Mean Quality of Life (MQoL)		4.68 (2.14)

Table 3.2: Logistic Regression of Predisposing Factor Determinants of Psychology Service Utilization

	<i>B (SE)</i>	<i>Wald χ^2</i>	<i>Odds Ratio</i>	<i>95% CI, Odds Ratio</i>	
				Lower	Upper
Age	-.029 (.013)	4.713*	.971	.946	.997
Male Gender	-.391 (.460)	.720	.677	.274	1.668
Non-White Race	-.971 (.521)	3.395	.379	.135	1.064
Total CPSC Visits	.341 (.079)	18.559**	1.407	1.204	1.643
Constant	.898 (.890)	1.019	2.456		

Nagelkerke $R^2 = .346$ * $p < .05$, ** $p < .01$

Table 3.3: Logistic Regression of Enabling Factor Determinants of Psychology Service Utilization

	<i>B (SE)</i>	<i>Wald χ^2</i>	<i>Odds Ratio</i>	<i>95% CI, Odds Ratio</i>	
				<i>Lower</i>	<i>Upper</i>
Total CPSC Visits	.305 (.079)	14.690**	1.356	1.160	1.585
Multiple CPSC Providers	2.323 (.682)	11.609**	10.210	2.683	38.856
Taking Anti-depressant	.340 (.497)	.469	1.405	.531	3.722
Taking Non-opioid	-1.185 (.583)	4.139*	.306	.098	.958
Taking Opioid	-.519 (.497)	1.090	.595	.225	1.577
Taking Anti-convulsant	-.210 (.494)	.180	.811	.308	2.136
Taking Anxiolytic/hypnotic	-.358 (.453)	.622	.699	.288	1.701
Taking Muscle relaxant	.271 (.753)	.129	1.311	.300	5.735
Constant	-1.261 (.581)	4.705*	.283		

Nagelkerke $R^2 = .424$

* $p < .05$, ** $p < .01$

Table 3.4: Logistic Regression of Need Factor Determinants of Psychology Service Utilization

	<i>B (SE)</i>	<i>Wald χ^2</i>	<i>Odds Ratio</i>	<i>95% CI, Odds Ratio</i>	
				<i>Lower</i>	<i>Upper</i>
Total CPSC Visits	.309 (.140)	4.902*	1.362	1.036	1.791
Primary Cancer Diagnosis	.060 (.807)	.005	1.061	.218	5.166
Psychological Comorbidity	.504 (.809)	.388	1.655	.339	8.078
Pain Comorbidity	.466 (.881)	.280	.627	.112	3.525
Reproductive System Comorbidity	.710 (.978)	.527	.492	.072	3.342
Sleep-related Comorbidity	-.063 (.822)	.006	.939	.187	4.704
GI System Comorbidity	-.071 (.672)	.011	.932	.250	3.479
Weight-related Comorbidity	-.276 (1.055)	.069	.758	.096	5.998
Pancreas/Gall Bladder/Kidney Disease Comorbidity	2.608 (1.109)	5.535*	13.574	1.545	119.234
Iritable Bowel Syndrome Comorbidity	.701 (1.108)	.400	2.016	.230	17.692
Quality of Life	-.303 (.246)	1.514	.739	.456	1.197
Pain Severity	-.057 (.221)	.067	.944	.612	1.456
Pain Intensity	-.223 (.212)	1.109	.800	.528	1.212
Emotional Distress	.632 (.343)	3.393	1.882	.960	3.687
Psychological Symptom Burden	.080 (.174)	.211	1.083	.770	1.524
Physical Symptom Burden	-.577 (.308)	3.524	.561	.307	1.026
BMI	.113 (.054)	4.340*	1.120	1.007	1.246
Systolic Blood Pressure	-.013 (.021)	.363	.988	.948	1.029
Constant	1.719 (3.590)	.229	5.578		

Nagelkerke $R^2 = .568$

* $p < .05$, ** $p < .01$

The third model examined the need factors and results are displayed in Table 3.4.

Findings indicate that the total number of CPSC visits ($p = .027$), having a diagnosed pancreas, gall bladder or kidney disease comorbidity ($p = .019$) and BMI ($p = .037$) were determinants of psychology service use.

All significant variables from the three preceding analyses were modeled together and are displayed in Table 3.5. The total number of CPSC visits ($p < .001$), seeing multiple providers ($p = .002$) and not taking a non-opioid analgesic ($p = .024$) were found to be the statistically significant determinants of psychology service use.

Table 3.5: Logistic Regression of All Significant Factor Determinants of Psychology Service Utilization

	<i>B (SE)</i>	<i>Wald χ^2</i>	<i>Odds Ratio</i>	<i>95% CI, Odds Ratio</i>	
				Lower	Upper
Total CPSC Visits	.358 (.096)	13.897**	1.431	1.185	1.728
Multiple CPSC Providers	2.673 (.846)	9.994**	14.489	2.762	76.009
Taking Non-opioid	-1.738 (.768)	5.114*	.176	.039	.793
Pancreas/Gall Bladder/Kidney Disease Comorbidity	.329 (.622)	.280	1.390	.411	4.701
BMI	.070 (.040)	3.123	1.073	.992	1.159
Age	-.028 (.016)	2.921	.972	.942	1.004
Constant	-2.032 (1.278)	2.528	.131		

Nagelkerke $R^2 = .505$

* $p < .05$, ** $p < .01$

Table 3.6 illustrates the findings from the second analytic step in which tolerance levels were used to decrease the multicollinearity. The findings were the same as the previous models with total number of CPSC visits, ($p = .008$), seeing multiple CPSC providers ($p = .003$), and not taking non-opioid analgesics ($p = .031$) as the statistically significant determinants to utilizing psychology services in the CPSC outpatient clinic.

Table 3.6: Decreased Multicollinear Logistic Regression

	<i>B (SE)</i>	<i>Wald χ^2</i>	<i>Odds Ratio</i>	<i>95% CI, Odds Ratio</i>	
				Lower	Upper
Total CPSC Visits	.401 (.150)	7.114**	1.493	1.112	2.005
Male Gender	-1.195 (.908)	1.734	.303	.051	1.793
Non-White Race	.076 (.969)	.006	1.079	.161	7.215
Age	-.031 (.025)	1.494	.970	.923	1.019
Primary Cancer Diagnosis	.000 (.811)	.000	1.000	.204	4.904
Psychological Comorbidity	-1.794 (1.063)	2.850	.166	.021	1.335
Pain Comorbidity	-.218 (.990)	.048	.804	.116	5.597
Reproductive System Comorbidity	.486 (1.335)	.132	1.626	.119	22.275
Sleep-related Comorbidity	.503 (.916)	.301	1.653	.275	9.955
GI System Comorbidity	-.752 (.784)	.920	.471	.101	2.192
Weight-related Comorbidity	-.285 (1.252)	.052	.752	.065	8.751
Pancreas/Gall Bladder/Kidney Disease Comorbidity	-.016 (.974)	.000	.984	.146	6.634
Irritable Bowel Syndrome Comorbidity	.757 (1.332)	.323	2.132	.157	29.034
Pain Severity	-.265 (.187)	2.007	.767	.532	1.107
Multiple CPSC Providers	3.463 (1.152)	9.036**	31.899	3.337	304.973
Taking Anti-depressant	1.218 (.886)	1.892	3.381	.596	19.183
Taking Non-opioid	-2.354 (1.092)	4.643*	.095	.011	.808
Taking Opioid	-.031(.833)	.001	.969	.189	4.964
Taking Anti-convulsant	-.355 (.838)	.180	.701	.136	3.621
Taking Anxiolytic/hypnotic	-.520 (.708)	.539	.595	.149	2.381
Taking Muscle Relaxant	.170 (1.220)	.019	1.185	.109	12.941
Taking Anti-psychotic	-.256 (1.716)	.022	.774	.027	22.352
Psychological Symptom Burden	.118 (.154)	.590	1.126	.832	1.522
BMI	.082 (.062)	1.726	1.085	.961	1.225
Systolic Blood Pressure	-.011 (.022)	.229	.990	.948	1.033
Quality of Life	-.270 (.236)	1.308	.764	.481	1.212
Constant	2.193 (3.554)	.381	8.962		

Nagelkerke $R^2 = .647$

* $p < .05$, ** $p < .01$

CHAPTER 4: DISCUSSION

With medical advances, Americans are living longer and with concurrent chronic illnesses at increasing frequency. Research has demonstrated that there are psychological comorbidities associated with chronic illnesses. Medical specialties, like palliative medicine, as well as systemic changes, like collaborative or stepped care, have worked to incorporate mental health care into the style in which chronically ill patients receive care. This study was an exploration to understand the determinants of palliative care patients' utilization of psychology services in an outpatient collaborative care clinic with on-sight psychology services available at very low (e.g., \$2 co-pay) or no cost.

Andersen's behavioral model has been used to explain health care utilization for decades and was used in this study to understand mental healthcare service utilization. The findings from the logistic regression model that included only significant determinants from each of Andersen's three factors as well as the model that eliminated variables based on multicollinearity both demonstrated that the enabling factors of Andersen's model are the primary determinants for patients to utilize an accessible psychological health service. The most highly associated determinant of utilizing psychology services was the total number of appointments these patients had at the CPSC outpatient clinic; whereby, the more visits they had with their palliative care doctor, the more likely the patients were to see the clinic's psychologist. This is most likely explained by exposure. With increased visits to see the doctor, the more exposure or opportunity the patient has to be identified as needing psychology services and, thus, be referred. This might

also be explained by severity. The patients with highest distress might be more likely to seek care from their physician most often.

This severity explanation might also elucidate the finding that patients seeing multiple physicians (opposed to one) at the clinic were more likely to seek psychology services because these patients may be experiencing increased distress. Each physician has a weekly clinic and if patients are in distress they may be less likely to wait for the following week's clinic in order to see their primary physician. This increased exposure to different physicians may also increase the likelihood that the patient is identified as needing psychological assistance.

Finally, there was a statistically significant determinant related to patients that are taking non-opioid analgesics. These results indicate that taking a non-opioid analgesic decreases the likelihood a patient would seek psychology services; therefore, there may be an association between the presence of pharmaceutical pain treatment and an absence of psychotherapy. One explanation for this finding is that patients taking a non-opioid analgesic may have less severe pain that is being controlled by over-the-counter pain relievers, and therefore it may be determined that these patients in particular do not need a psychology referral for their pain management. Physicians may also perceive patients' ability to self-manage their symptoms as a proxy for their overall well-being, deducing that the individuals in control of their own pain management are doing well psychologically.

It should be noted that the perceived need factors, which included self-report measures assessing psychological distress, were not statistically significant determinants of use of psychology services. Of note, neither a patient's emotional distress nor psychological symptom burden were significant determinants of psychology service utilization. This intriguing result may be further evidence for Fisch's (2003) finding suggesting that healthcare providers do not

adequately address mental illness in this population. However, these data do not include referral information, so it is not clear which patients were referred by their CPSC physician to the psychologist and then, perhaps, failed to schedule or attend a psychology service visit.

Regardless of referral status, this study suggests that patients who might benefit from seeing the psychologist are not receiving this treatment. It is also likely that these palliative patients may be too sick to utilize these services. Even with onsite services available, the effort to stay and work on their mental health may be too costly for these patients.

This study is not without limitations. Although representative of the palliative care population, this sample is disproportionate from the general population in terms of sex and race/ethnicity. The data were also collected in one clinic in the southeastern US; therefore, caution should be taken in generalizing these results. The use of these data for secondary analysis has its own limitations, as the research question being assessed in this study is not the original reason these data were collected. The design was limited to the information assessed and therefore might be missing some determinants that could further inform the research question.

Despite these limitations, with the results of this study, researchers and clinicians alike can begin to understand which palliative care patients are utilizing psychology services. This understanding is an important step toward ensuring that palliative patients in need of psychology services are being identified by their physician, utilizing treatment services and following through on their psychological treatment. This is of value because research has demonstrated that treating patients' mental health, as well as physical health, leads to improved overall health outcomes in chronically ill patients. The collaborative and stepped care models of care are designed to increase communication and decrease barriers for patients in receiving mental health care. These models have been shown to decrease overall healthcare cost and improve health

outcomes; however, if patients are not being identified and receiving referrals for mental health services, these systemic changes will not reach their full potential.

Furthermore, research specifically designed to understand the determinants to mental health care can further identify the patients that are seeking mental health services. With this knowledge, providers can be educated on which patients are likely to follow through with treatment seeking and which patients are not. Other important clinical questions that need further understanding include: Are patients with mental health needs being identified as needing mental health care and receiving referrals for such services?; Are the patients being referred for services following up with a mental health professional? If not, what are their perceived barriers to treatment seeking?; Are the patients that seek mental health care, especially within a collaborative care context, actively engaged in treatment?. Answering these questions will allow for targeted interventions designed at increasing mental health service utilization in palliative care outpatient clinic populations.

References

- Akechi, T. (2010). Psychotherapy for depression among incurable cancer patients. *Cochrane Database of Systematic Reviews*(11).
- Andersen, R., & Newman, J. F. (2005). Societal and individual determinants of medical care utilization in the United States. *Milbank Quarterly*, 83(4), Online-only. doi: 10.1111/j.1468-0009.2005.00428.x
- Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior*, 36, 1-10.
- Anderson, G., Herbert, R., Zeffiro, T., & Johnson, N. (2004). Chronic conditions: Making the case for ongoing care: Johns Hopkins University.
- Ballenger, J. C., Davidson, J. R., Lecrubier, Y., Nutt, D. J., Jones, R. D., & Berard, R. M. (2001). Consensus statement on depression, anxiety, and oncology. *Journal of clinical psychiatry* 62(S8), 64-67.
- Besisik, S. K., Kocabey, G., & Caliskan, Y. (2003). Major depression and psoriasis activation due to interferon-alpha in a patient with chronic myeloid leukemia; "overlooked and/or misdiagnosed adverse reaction in malignant disease.". *American journal of hematology* 74, 224.
- Block, S. D. (2000). Assessing and managing depression in the terminally ill patient. ACP-ASIM End-of-Life Care Consensus Panel. American College of Physicians- American Society of Internal Medicine. *Annals of Internal Medicine*, 132, 209-218.
- Breitbart, W., & Jacobsen, P. B. (1996). Psychiatric symptom management in terminal care. *Clinical Geriatric Medicine*, 12, 329-347.
- Breitbart, W., Rosenfeld, B., Pessin, H., Kaim, M., Funesti-Esch, J., Galietta, M., . . . Brescia, R. (2000). Depression, hopelessness, and desire for hastened death in terminally ill patients with cancer. *JAMA*, 284, 2907-2911.
- Chapman, D. P., Perry, G. S., Strine, T. W. (2005). The vital link between chronic disease and depressive disorders. *Preventing Chronic Disease*.
- Cleeland, C. S. (1989). Measurement of pain by subjective report. In Chapman, C. R. & Loeser, J.D. (Ed.), *Advances in pain research and therapy* (Vol. 12, pp. 391-403). New York: Raven Press.

- Cleeland, C. S., Mendoza, T. R., Wang, X. S., Chou, C., Harle, M., Morrissey, M., & Engstrom, M. C. (2000). Assessing symptom distress in cancer: The M.D. Anderson symptom inventory. *Cancer, 89*, 1634-1646.
- Cohen, S. R., & Mount, B. M. (2000). Living with Cancer: "Good" Days and "Bad" Days—What Produces Them? *Cancer, 89*(8), 1854-1865.
- Cohen, S. R., Mount, B. M., Bruera, E., et al. (1997). Validity of the McGill Quality of Life Questionnaire in the palliative care setting: a multi-centre Canadian study demonstrating the importance of the existential domain. *Palliative Medicine, 11*, 3-20.
- Cohen, S. R., Mount, B. M., Strobel, M. G., & Bui, F. (1995). The McGill Quality of Life Questionnaire: A measure of quality of life appropriate for people with advanced disease. A preliminary study of validity and acceptability. *Palliative Medicine, 9*(3), 207-219.
- Depression and anxiety linked to hypertension.* (2000). Retrieved from: www.sciencedaily.com/releases/2000/03/000324094550
- First, M., Spitzer, R., Gibbon, M., & Williams, J. (1995). *Structured Clinical Interview for DSM-IV Axis I Disorders-Patient Edition (SCID-I/P, Version 2.0)*. New York: Biometrics Research Department, New York State Psychiatric Institute.
- Fisch, M. J., Titzer, M. L., Kristeller, J. L., Shen, J., Loehrer, P. J., Jung, S. H., . . . Einhorn, L. H. (2003). Assessment of quality of life in outpatients with advanced cancer: the accuracy of clinician estimations and the relevance of spiritual well-being—a Hoosier Oncology Group Study. *Journal of Clinical Oncology 21*, 2754-2759.
- Ford, S., Fallowfield, L., & Lewis, S. (1996). Doctor-patient interactions in oncology. *Social Science Medicine, 42*(1511-1519).
- Geinitz, H., Zimmermann, F. B., Thamm, R., Keller, M., Busch, R., & Molls, M. (2004). Fatigue in patients with adjuvant radiation therapy for breast cancer: Long-term follow-up. *Journal of Cancer Research in Clinical Oncology 130*, 327-333.
- Green, A. I., & Austin, C. P. (1993). Psychopathology of pancreatic cancer. A psychobiologic probe. *Psychosomatics, 34*, 208-221.
- Han, B., Gfroerer, J. C., Colpe, L. J., Barker, P. R., & Colliver, J. D. (2011). Serious psychological distress and mental health service use among community-dwelling older U.S. adults. *Psychiatric Services, 62*(3), 291-298.
- Harris, K. M., Edlund, M. J., & Larson, S. (2005). Racial and ethnic differences in the mental health problems and use of mental health care. *Medical Care, 43*, 775-784.

- Ito, M., Onose, M., Yamada, T., Onishi, H., Fujisawam, S., & Kanamori, H. (2003). Successful lithium carbonate treatment for steroid-induced depression following bone marrow transplantation: A case report. *Japanese Journal of Clinical Oncology*, *33*, 538-540.
- Kadan-Lottick, N. S., Vanderwerker, L. C., Block, S. D., Zhang, B., & Prigerson, H. G. (2005). Psychiatric disorders and mental health service use in patients with advanced cancer. *Cancer*, *104*(12), 2872-2881. doi: 10.1002/cncr.21532
- Kang, W. (2011). Missing data methods: Time-series methods and applications. *Advances in Econometrics*, *27B*, 235-251.
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K. R., . . . Wang, P. S. (2003). The Epidemiology of Major Depressive Disorder. *JAMA*, *289*(23), 3095-3105. doi: 10.1001/jama.289.23.3095
- Koffman, J., Burke, G., Dias, A., Raval, B., Byrne, J., Gonzales, J., & Daniels, C. (2007). Demographic factors and awareness of palliative care and related services. *Palliative Medicine*, *21*, 145-153.
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine*, *16*(9), 606-613.
- Massie, M. J. (2004). Prevalence of depression in patients with cancer. *Journal of the National Cancer Institute Monograph*, 57-71.
- McDonald, M. V., Passik, S. D., Dugan, W., Rosenfeld, B., Theobald, D. E., & Edgerton, S. (1999). Nurses' recognition of depression in their patients with cancer. *Oncology Nursing Forum*, *26*(593-599).
- National Comprehensive Cancer Network (NCCN). *The NCCN 1.2010 Palliative Care Clinical Practice Guidelines in Oncology*. (2010). Retrieved from www.nccn.org.
- Passik, S. D., Dugan, W., McDonald, M.V., Rosenfeld, B., Theobald, D. E., & Edgerton, S. (1998). Oncologists' recognition of depression in their patients with cancer. *Journal of Clinical Oncology* *16*, 1594-1600.
- Pedhazur, E.J. (1997). Regression diagnostics. *Multiple regression in behavioral research: Explanation and prediction, Third Edition*. Wadsworth Thomson Learning, USA
- Portenoy, R. K., Thaler, H. T., Kornblith, A. B., Lepore, J. M., Friedlander-Klar, H., Coyle, N., Hoskins, W. (1994). Symptom prevalence, characteristics and distress in a cancer population. *Quality of Life Research*, *3*, 183-189.
- Pullins, J. E., Tucker, D. C., Kvale, E., Mugavero, M., Ritchie, C. S., & Roth, D. (2010). *Pain in palliative and supportive care outpatients: A longitudinal exploration*. Doctor of Philosophy dissertation, University of Alabama at Birmingham. (3427165)

- Reeve, J. L., Lloyd-Williams, M., & Dowrick, C. (2008). Revisiting depression in palliative care settings: the need to focus on clinical utility over validity. *Palliative Medicine*, 22, 383-391.
- Roche, C. (2012). *Dissertation proposal*. Nursing. University of Alabama at Birmingham. Birmingham, AL.
- Scherrer J. F., Bucholz K. K., Eisen S. A., Lyons, M. J., Goldberg J., Tsuang M., True, & W. R. (2003). A twin study of depression symptoms, hypertension, and heart disease in middle-aged men. *Psychosomatic Medicine*, 65(4), 548-557. doi: 10.1097/01.PSY.0000077507.29863.CB
- Scogin, F., & Shah, A. (2006). Screening older adults for depression in primary care settings. *Health Psychology*, 25(6), 675-677.
- Scogin, F. R., Hanson, A., & Welsh, D. (2003). Self-administered treatment in stepped-care models of depression treatment. *Journal of Clinical Psychology*, 59(3), 341-349. doi: 10.1002/jclp.10133
- Solano, J. P., Gomes, B., & Higginson, I. J. (2006). A comparison of symptom prevalence in far advanced cancer, AIDS, heart disease, chronic obstructive pulmonary disease and renal disease. *Journal of Pain and Symptom Management*, 31(1), 58-69.
- Spitzer, R. L., Kroenke, K., & Williams, J. B. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. Primary care evaluation of mental disorders. Patient Health Questionnaire. *JAMA*, 282(18), 1737-1744.
- Spitzer, R. L., Kroenke, K., Williams, J. B., & Lowe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, 166(10), 1092-1097.
- Spitzer, R. L., Williams, J. B., Kroenke, K., Hornyak, R., & McMurry, J. (2000). Validity and utility of the PRIME-MD patient health questionnaire in assessment of 3000 obstetric-gynecologic patients: the PRIME-MD Patient Health Questionnaire Obstetrics-Gynecology Study. *American Journal of Obstetric Gynecology*, 183(3), 759-769.
- Stiefel, F., Trill, M. D., Berney, A., Nunez-Olarte, J. M., & Razavi, D. (2001). Depression in palliative care: a pragmatic report from the Expert Working Group of the European Association for Palliative Care. *Supportive Care Cancer*, 9, 477-488. doi: 10.1007/s005200100244
- Thielke, S., Vannoy, S., & Unutzer, J. (2007). Integrating mental health and primary care. *Primary Care Clinical Office Practice*, 34, 571-592.

Trask, P. C., Schwartz, S. M., Deaner, S. L., Paterson, A. G., Johnson, T., Rubenfire, M., & Pomerleau, O. F. (2002). Behavioral medicine: The challenge of integrating psychological and behavioral approaches into primary care. *Effective Clinical Practice* (March/April).

U.S. Surgeon General's Office. *Mental health: A report of the surgeon general*. (1999). Retrieved from www.surgeongeneral.gov/library/mentalhealth/chapter2/sec21.

Wu, S. Y., & Green, A. (2000). Projection of chronic illness prevalence and cost inflation: RAND Corporation.

Appendix

Appendix 1: Code Book		
<i>Variable Name</i>	<i>Variable Description</i>	<i>Variable Value</i>
ID	Study Identification Number	
TotAppt	Total Number of Appointments to CPSC Physician	
Age	Patient's Age	
Gender	Patient's Gender	0 = Female, 1 = Male
Race	Patient's Race	0 = Non-White, 1 = White
Condition	Primary Diagnosis	0 = Not Cancer, 1 = Cancer
PsychVisits	Total Number of Psychology Service Visits	
Psych_Com	Psychological Comorbidity	0 = No, 1 = Yes
Pain_Com	Pain Disorder Comorbidity	0 = No, 1 = Yes
Repro_Com	Reproductive System Comorbidity	0 = No, 1 = Yes
FatInsom_Com	Sleep-related Disorder Comorbidity	0 = No, 1 = Yes
GI_Com	Gastrointestinal Tract Comorbidity	0 = No, 1 = Yes
Weight_Com	Weight-related Comorbidity	0 = No, 1 = Yes
OthOrg_Com	Pancreas/Gall Bladder/Kidney Disease Comorbidity	0 = No, 1 = Yes
IBS_Com	Irritable Bowel Syndrome Comorbidity	0 = No, 1 = Yes
Opioid	Taking an Opioid	0 = No, 1 = Yes
anti_depres	Taking an Antidepressant	0 = No, 1 = Yes
anti_convul	Taking an Anticonvulsant	0 = No, 1 = Yes
non_opioid	Taking a Non-opioid	0 = No, 1 = Yes
anxi_hypno	Taking an Anxiolytic/hypnotic	0 = No, 1 = Yes
Muscle_Relax	Taking a Muscle Relaxant	0 = No, 1 = Yes
Sys_BP	Systolic Blood Pressure	
MDA_1	MD Anderson PAIN Assessment	0 = No Pain - 10 = Worst Pain Imaginable
MDA_2	MD Anderson FATIGUE Assessment	0 = No Fatigue - 10 = Worst Fatigue Imaginable
MDA_3	MD Anderson NAUSEA Assessment	0 = No Nausea - 10 = Worst Nausea Imaginable
MDA_4	MD Anderson DEPRESSION Assessment	0 = No Depression - 10 = Worst Depression Imaginable
MDA_5	MD Anderson ANXIETY Assessment	0 = No Anxiety - 10 = Worst Anxiety Imaginable
MDA_6	MD Anderson DROWSINESS Assessment	0 = No Drowsiness - 10 = Worst Drowsiness Imaginable

MDA_7	MD Anderson SHORTNESS OF BREATH Assessment	0 = No Shortness of Breath - 10 = Worst Shortness of Breath Imaginable
MDA_8	MD Anderson APPETITE Assessment	0 = Best Appetite - 10 = Worst Appetite Imaginable
MDA_9	MD Anderson SLEEP Assessment	0 = Best Sleep - 10 = Worst Sleep Imaginable
MDA_10	MD Anderson WELLBEING Assessment	0 = Best Feeling of Wellbeing - 10 = Worst Feeling of Wellbeing
BPI_sev	Pain Severity score from Brief Pain Inventory	0 = No Pain - 10 = Worst Pain
BPI_intr	Pain Interference score from Brief Pain Inventory	0 = No Interference - 10 = Interferes Completely
BMI	Body Mass Index (weight (lb) / [height (in)] ² x 703)	
Di_provider	Dichotomous Provider indicator	0 = Single Provider, 1 = Multiple Providers
PsychVisit_Di	Dichotomous Psychology Service Utilization Indicator	0 = No Psychology Service Visit, 1 = At least 1 Psychology Service Visit
phys_symp_burden	Physical Symptom Burden (Mean of MDA items 1 – 3 + MDA 6 - 10)	0-10
psych_symp_burden	Psychological Symptom Burden (Mean of MDA items 4 & 5)	0-10
EmotDistress	Emotional Distress (Sum of GAD-7 and PHQ-9 using Z score transformation because the scales are based on different totals)	
MQOL_Total	Quality of Life Score from McGill Quality of Life Scale [Mean of 4 subscales]	1-7