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**Integrated Behavioral Healthcare at UTMB:
A Cost/Benefit Study**

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**Integrated Behavioral Healthcare at UTMB:
A Cost/Benefit Study**

by

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Integrated Behavioral Healthcare at UTMB:

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In the United States, behavioral health issues such as depression are highly prevalent and come at a major economic cost. However, the systems in place to care for behavioral health are often inefficient and fragmented between primary care providers and psychiatrists as well as other behavioral healthcare specialists. To address this, integrated care models are being investigated to correct these inefficiencies. One of the best known and most studied models of integrated care, the collaborative care model, is an approach that embeds a care manager, usually a master's level social worker or equivalent, into a primary care clinic in order provide for the patient's behavioral needs and to coordinate patient care between psychiatrists and PCPs. Several major studies have shown this model to improve quality of care for patients while reducing healthcare costs. Though insurers in the current fee-for-service model of health care do not reward this improved quality of care and reduction in treatment costs, accountable care organizations will provide incentives for such care. Therefore, it is important for major healthcare networks such as UTMB to begin assessing the implementation of such integrated programs in order to be ready for the future. We used the SAMHSA-HRSA business model along with predictions of the number of depression-related visits at local primary care clinics to describe different challenges and variables involved with implementing an integrated behavioral healthcare system at UTMB.

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Chapter 1: Introduction

Research Questions

In the published literature, what are the estimated financial costs and benefits of an integrated behavioral healthcare program across different programs? How can that information be applied to data for local primary care clinics?

Specific Aims

The integrated, or collaborative, care model for behavioral health is an approach that is receiving increased interest due to the expansion of health care delivery and payment systems that focus on better controlling chronic conditions. The model embeds a care manager, usually a master's level social worker or equivalent, into a primary care clinic in order to provide for the patient's behavioral needs and to coordinate patient care between psychiatrists and primary care physicians (PCPs) and other behavioral health providers as needed (Unutzer, Harbin, Schoenbaum, & Druss, 2013). Behavioral health covers a wide range of psychiatric, emotional, and substance abuse problems, but I focus on depression and major depressive disorder as an example of a behavioral health issue. Depression has a relatively high prevalence and has been studied more extensively in the integrated care context. In the first part of this capstone, I review the published literature on the costs and benefits of the model in its various forms. In the second part of the capstone, I apply the information available in the literature to a business model, developed by SAMHSA-HRSA (CSI Solutions, 2013), to describe the potential financial costs and benefits of an integrated mental health program at the University of Texas

Medical Branch (UTMB). The business model used was developed by the Substance Abuse and Mental Health Services Administration (SAMHSA) and the Health Services and Resources Administration (HRSA) and is focused on their target population of clinics with high levels of publicly insured patients. The general business model, however, is broadly applicable.

Significance

Employing the collaborative care model has the potential to have a positive impact on patient outcomes while reducing treatment costs to payers/insurers. Though insurers in the current fee-for-service model of care typically do not reward providers for this reduction in treatment costs, accountable care organizations (ACOS) and population health management health care delivery models are structured to provide incentives for such care. Implementation of the Affordable Care Act and other industry changes are expected to increase the number of ACOS and population health management contracts in the regional health care delivery market. Therefore, it is important for healthcare networks such as UTMB to begin assessing the implementation of such integrated programs in order to be prepared for potential changes in payment models.

Chapter 2: Background and Literature Review

State of Behavioral Healthcare in the United States

Behavioral health issues are widely prevalent within the United States and greatly impact the nation's economy. From National Comorbidity Survey-Replication (NCS-R) data in 2001-2003, the prevalence of major depressive disorder, as diagnosed by DSM-IV criteria, was 6.7% and the prevalence of any mental disorder within the last 12 months was 26.2% (Kessler et. al, 2005). When examining lifetime prevalence with the same data set, these numbers dramatically increased to 16.6% and 46.4%, respectively (Kessler, Chiu, Demler, Walters, 2005). The NCS-R is a cross-sectional, nationally representative survey of 10,000 respondents carried out from 2001 to 2002. The survey is a replication of the original NCS survey carried out in the early 1990s.

Other, more current estimates include those from the Behavioral Risk Factor Surveillance System (BRFSS) and the National Health and Nutrition Examination Survey (NHANES). The BRFSS is a national, random-digit-dialed telephone survey covering many different areas in behavioral health. Data from the 2006-2008 survey covered 235,067 adults living in 45 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. Of those surveyed, 9% met criteria for depression and 3.4% met criteria for major depression. Patients were asked about symptoms over the past two weeks using questions from the Patient Health Questionnaire-8 (PHQ-8). Those who had 4 or less symptoms were classified as depressed while those with 5 or more symptoms were listed as having major depression (CDC, 2010). The National Health and Nutrition Examination Survey (NHANES) is an annual cross-sectional study examining the health and nutritional status of adults and children within the United States. The PHQ-9 is used to assess depressive symptoms over the previous two weeks. Results from 2007-2010 showed that 8% of respondents reported current depression (PHQ-9 score of 10 or

greater) (CDC, 2012). Though it is difficult to compare these results given the varying definitions of depression within the literature, it remains apparent that depression affects a significant portion of the U.S. population.

This high prevalence of depression also comes at a significant economic burden when examining direct costs to the healthcare system and indirect costs such as lost work time, supplemental security income (SSI) and Social Security Disability Insurance (SSDI), incarceration, and homelessness (Insel, 2008). The Substance Abuse and Mental Health Services Administration (SAMHSA) estimated mental health expenditures to be \$100 billion in 2003, which represented 6.2% total healthcare expenditures. The National Institute of Mental Health (NIMH) estimated the indirect costs (lost earnings, SSI, and SSDI) to be \$217.6 billion bringing the total cost to \$317.6 billion the year 2002 (Insel, 2008). More recently, in 2009, SAMHSA estimated direct costs of mental healthcare to be \$147 billion. Public and private insurers accounted for over half of these costs (SAMHSA, 2013).

These high prevalence and cost figures indicate a major problem with the current mental healthcare system as well as an opportunity for improvement. In order to address this problem, we must understand where these patients seek care and find ways to improve treatment efficiency and effectiveness. Data from the National Comorbidity Surveys (NCS) has been used to examine patterns of mental health prevalence and treatment. Among providers, primary care clinics see the highest proportion of mental health patients and have seen the highest growth in prevalence of mental health visits in recent years. Nearly one third (32.3%) of mental health patients are treated in primary care clinics and these clinics have experienced a 153% increase in the number of mental

health patients from the early 1990s to the early 2000s (NCS vs NCS-R sample). This PCP data compares to psychiatrists who manage 25.8% of the nation's mental health patients and have experienced 29% growth over the same time period (Wang et. al, 2006).

Another study using NCS-R data (Wang et al., 2005) observed a similar trend, but also examined effectiveness of care according to specialty. The study examined healthcare usage among individuals with at least one DSM-IV diagnosis within the last 12 months. Among all respondents, 41.1% received some form of treatment. Of these individuals, 12.3% were treated by a psychiatrist, 16% by a non-psychiatrist mental health professional, and 22.8% by a general medical provider. The probability of receiving minimally adequate treatment as defined by 2 months of pharmacotherapy with 4 physician visits or 8 30-minute sessions of psychotherapy was highest among psychiatrists (53.3%) and non-psychiatrist mental health professionals (51.1%) and lowest among general medical practitioners (33.2%). These studies show that most of the nation's mental health patients are seen by PCPs and indicate a need for improvement in quality of care.

Collaborative Care Model of Behavioral Health

Integrated behavioral health is not a brand new topic. There have been many attempts in the past to bring more behavioral expertise into the primary care setting. Efforts initially focused on routine screening followed by specialty referral. Other attempts include co-locating psychiatrists within the same clinics as PCPs, and using call centers to provide nurse-aided treatment of behavioral health patients. None of these

efforts alone were shown to provide significant benefits to patients. Collaborative care is a newer, more integrated model described by the University of Washington's Advancing Integrated Mental Health Solutions (AIMS) Center. The collaborative care model of behavioral health seeks to bring mental health specialty care to high volume primary care clinics via a care management team in an effort to reduce treatment costs and increase quality of care (Unutzer, 2013). In addition to introducing this care management team, collaborative care introduces two important concepts in treating mental health issues within the primary care setting: measurement-based care and stepped care. Measurement-based care refers to tracking progress of a condition using a standardized scale and stepped care involves adjusting treatments until a certain goal is attained. Both of these practices already exist in the treatment of common medical conditions such as hypertension, hyperlipidemia, and diabetes. However, this approach is relatively new for mental health issues. When considering depression, a tool such as the Patient Health Questionnaire (PHQ-9) would be used to screen patients, take baseline measurements, and monitor for symptom improvement over time. This approach requires providers to change treatment plans every 10-12 weeks until a target of at least 50% symptom reduction is achieved (University of Washington, 2014). It is also important to note that these screening tools, while helpful, are not meant to completely replace sound clinical judgment. The tools should be considered within the overall clinical picture of each patient.

The IMPACT study is the largest analysis of the collaborative care model to date. The study included 1800 seniors (60 and over) with depression in 18 primary care clinics across five states and took place from July 1999 to August 2001. Participants had

Medicare or Medicaid and averaged 3.5 chronic medical conditions. Participants were randomized to control and intervention groups (roughly 900 per group). Patients in the intervention group had access to a care manager who consulted with a psychiatrist and the PCP. The care manager provided education, medication support, and problem-solving skills. Patients had access to the program for 12 months. Most participants (53%) met criteria for major depressive disorder and 71% reported 2 or more prior depressive episodes. Outcomes were measured by the Symptom Checklist-20 (SCL-20), a twenty-item depression severity scale. Treatment response was defined as at least a 50% reduction in symptoms from baseline. Remission was described as an SCL-20 of less than 0.5. Intervention patients had significantly higher treatment response at 12 months (44.67% vs 19.22%, OR 3.45) and had better remission outcomes at 12 months (25.01% vs 8.30%, OR 3.72) (Unutzer, Katon, & Callahan, 2002).

In addition to improving quality of care, the collaborative care model has been shown to reduce overall treatment costs. A 2003 study examined these costs through prospective examination of two IMPACT study sites. There were a total of 551 patients assigned to IMPACT intervention (279) or routine care (272). Mean age was 72.7 years. All patients met Structured Clinical Interview DSM-IV criteria for Major Depressive Disorder or dysthymia or both. The four-year mean total healthcare costs for each intervention patient was \$29,422 (95% CI: 26,479-32,365) and for the control group was \$32,785 (95% CI: 27,648-37,921). Costs were lower in every category for the intervention (outpatient: mental health and pharmacy, and inpatient: medical, mental health and substance abuse) (Unutzer, Katon, & Fan, 2008). The first year showed an increase in cost in intervention patients due to a \$522 initial investment per patient.

However, the intervention group showed decreased costs in subsequent years resulting in an overall savings of \$3,363 per average patient over four years. These data were taken from 1999 to 2003. After adjusting for health care inflation, the authors estimated the current intervention cost to be approximately \$900 per program participant with a net savings of \$5,200 per participant over four years (Unutzer, 2013).

These reductions in costs and improved quality of care make this model a promising tool for the future of behavioral healthcare. The model is particularly useful when working within HMOs, accountable care organizations, and other managed care entities because these organizations provide incentives for treating patients at lower costs. However, most healthcare providers in the U.S. work within a fee-for-service model, which does not provide such incentives. A clinic may bear the up-front costs to implement this model and successfully reduce healthcare costs, but insurers will provide no incentives. Hospital systems such as UTMB that operate largely within this type of insurance system and wish to implement such a program must be diligent to understand up-front costs and ways to make the program profitable. The benefits in terms of patient outcomes are compelling motivation alone, but sustainability of the model requires adequate financial resources and thus necessitates considering the business model.

Business Model for Collaborative Care

The SAMHSA-HRSA Center for Integrated Health Solutions published a method of evaluating the costs and benefits of an integrated behavioral health program. The model used is $S+I+T \leq X+P+R$. The first part of the equation represents costs as screening (S), intervention (I), and transition costs (T). The second portion of the model

indicates potential pay-offs including reimbursement for screening (X), gains in productivity (P), and reimbursement for intervention (R) (CSI Solutions, 2013). The payoffs must exceed the costs involved for this model of care to be financially viable.

Screening Costs

There is not much specific information in the literature about how these collaborative care models screen patients. The IMPACT study took referrals from clinicians or patients themselves or approached patients for screening. The study used a 2-item depression screener and those eligible underwent a Structured Clinical Interview (SCID) to assess whether patients met research criteria for depression or dysthymia. Those who screened positive for alcohol problems, bipolar disorder, psychosis and cognitive impairment were excluded. Likewise, those currently undergoing treatment by a psychiatrist were excluded. While this is a thorough approach, the SCID is for research purposes and would prove impractical for the typical clinic setting (Unutzer, Katon, & Callahan, 2002). Another collaborative care program, the DIAMOND program, seeks to translate the research model in the IMPACT study into a more practical approach in clinics across Minnesota. This program is available in Minnesota to adults 18 and older who meet DSM-IV-TR criteria for MDD or dysthymia and have a Patient Health Questionnaire-9 (PHQ-9) score ≥ 10 . The PHQ-9 is a nine-item depression screening tool based on criteria from the Diagnostic and Statistical Manual of Mental Disorders (DSM). The PCP reviews patients' symptoms and PHQ-9 results in order to make a diagnosis to determine eligibility for the program. The care manager meets patients for enrollment, intake, and follow-up. Patients are also screened for other mental health

problems such as substance abuse, anxiety, and bipolar disorder. Those in need of more specialized care are referred accordingly (A New Direction in Depression Treatment, 2010). This seems to be a more practical approach to screening and intake for clinics. However, the available information on the program provides no concrete estimates of the time involved in this process. The PHQ-9 is a brief, nine-item screening tool that can be administered very quickly. Ruling out other medical disorders will require additional time. A reasonable estimate of screening time may be 10-15 minutes, or the time for a standard PCP visit. Most of these screenings are already part of annual well visits or new patient visits.

Intervention Costs

Overall intervention costs are also difficult to assess. The IMPACT study estimated an up-front cost per patient of \$900. However, this was a research study so this may be an overestimate of clinical costs. A meta-analysis examined the economics of multiple different integrated care programs. Of the 20 studies included in the economic review, 13 reported program costs. The number of participants in these programs ranged from 40-489 with a median of 211. Four programs reported average costs per patient, which ranged from \$477 to \$2160 with a median cost of \$685. Nine studies reported incremental costs per patient, which ranged from \$104 to \$850 with a median cost of \$204 when compared to standard care. Program costs included the time of the case manager, PCP, and consulting psychiatrist. To estimate costs, most of these studies looked at collaborative care activities separately. For instance, a psychiatrist's activities included consultation and communications with the care manager or PCP; PCP activities

included communications with the care manager or consulting psychiatrist; and care manager's activities included time for record keeping, coordinating care, and patient interactions. Most studies also included cost of screening and some included training costs (Jacob et al, 2012).

Office staffing is another concern when trying to estimate intervention costs. Different sized clinics will require differing numbers of care managers. Most of the information available regarding this topic describes care manager caseloads and the time needed for psychiatric consultation. The DIAMOND program described a range of 90-120 patients (A New Direction in Depression Treatment, 2010) while the AIMS center describes a range of 100-150 patients per care manager (University of Washington, 2014). Thus one could reasonably expect a caseload between 90-150 patients. It is also important to consider factors that could affect caseload numbers such as socio-demographic characteristics of the patient population, complexity of cases, and care manager training and experience. It will likely take care managers several months to gather the experience necessary to achieve adequate efficiency.

A psychiatrist can expect to spend roughly three hours per week for each care manager who is assumed to be working at least 0.5 FTE. This time includes care manager consultation, preparation for consultation, and documentation of recommendations in electronic medical records. The time may also include consultation with PCPs either in person or via telemedicine (University of Washington, 2014). Estimated weekly psychiatric consultation time would be adjusted for case managers working 0.4 FTE or less as their caseload would be significantly smaller. No information was found regarding the estimated time spent in the communication between PCPs and

psychiatrists. However, the model is designed such that most of the communication PCPs have with psychiatrists is via care managers. Direct communication between the PCP and psychiatrist is only expected to occur with difficult cases where patients fail several treatments. Care managers are expected to present brief assessments and plans to PCPs in a matter of a few minutes per patient. The idea of this model is to support PCPs so that they are free to see more patients with general medical conditions.

Transition Costs

Transition costs are also important to consider before implementing a collaborative care program. Transition costs include time and money lost to staff training, adjusting to new EMR systems and adapting to new workflows. The AIMS center has a free online program with 17.5 hours of content to introduce and explain the duties of the collaborative care team (University of Washington, 2014). SAMHSA-HRSA also published a hypothetical scenario in which it used a time of 16 hours for transition time (CSI Solutions, 2013). If one calculates the hourly rates of each provider of the care team and multiplies this by a rough estimate of 16 to 17 hours of training time, one may find a reasonable estimate of total training costs. Time and productivity costs associated with adjusting to new EMRs and workflows are more difficult to predict and depend on individual clinics. We may assume that these costs are much less than total training costs.

Screening Reimbursements

Reimbursement for screenings depends on the classification of the primary care clinic. According to 2014 guidelines published by the National Committee for Quality Assurance (NCQA), depression screening for adults and adolescents aged 12-18 years is a component of a patient-centered medical home (PCMH) (National Committee for Quality Assurance, 2014). Screenings must be performed using a standardized tool such as the PHQ-9 and clinics must have the appropriate services available for patients who screen positive. Thus clinics qualifying as a PCMH would be able to seek reimbursement for screening services.

Clinics operating outside this classification will have more trouble seeking reimbursements for mental health screenings. Medicare part A and B covers annual depression screens in a few different scenarios: 1) Standalone, which is not associated with an Initial Wellness Visit (AWV) or Initial Preventive Physical Exam (IPPE); 2) as part of the IPPE; and 3) as part of an Initial AWV (Whaley, 2013). Depression screening is also covered under Medicaid within the state of Texas (Kaiser, 2013).

Intervention Reimbursement

Reimbursements for interventions are also difficult to assess because most of the literature describes collaborative care through exterior funding sources or managed care organizations. As noted previously, there are financial gains to be had when working with HMOs or accountable care organizations that provide incentives for treating patients at lower costs to insurers. These types of insurance systems make collaborative care easier to implement. However, hospital systems that operate under a fee-for-service insurance system, such as UTMB, face more difficulties. Perhaps the largest problem is

that there is no widespread system in place that allows for easy reimbursement of care management services. The two major services include those from the care manager and the psychiatric consultant. The steering committee for the DIAMOND program estimated staffing costs and found 80% to be attributed to care managers while 10% were attributed to psychiatric consultants (A New Direction in Depression Treatment, 2010). These figures highlight the importance of seeking reimbursement for services; otherwise, programs will be left with tremendous costs to bear.

Some of the barriers to reimbursement include rules concerning medical necessity of the duties of care managers, eligibility rules concerning who may provide reimbursable care, and use of medical codes. Billing codes for care management services are not widely accepted. Since care managers are non-physicians, one useful strategy is to bill for services using the supervising physicians' identification numbers. In this situation, reimbursement is most likely if care management services are an integral part of the physician's service, provided under direct physician supervision, not itemized separately from the physicians' services, provided within the physician's office and described completely in the medical chart as a separate entry. Psychiatric codes for behavioral assessments and interventions may also be a useful option for care managers. Licensed psychologists, nurses, social workers, and other non-physician clinicians such as care managers may be able to use these codes or other codes that fall under the scope of their professional licensure or training (Bachman, Pincus, Houtsinger, Unutzer, 2006).

Gains in Productivity

Gains in productivity will primarily be felt by PCPs. In collaborative care, the care manager and consulting psychiatrist are meant to work together to support PCPs and reduce time spent with behavioral issues. The hope is that PCPs will be able to see a higher number of general medical patients and increase clinic revenue. Estimates for this increased productivity are very dependent on each individual clinic. Clinics with different patient populations will undoubtedly have different baseline visit times and the implementation of collaborative care programs will impact each of these clinics in different ways.

The SAMHSA-HRSA business model for collaborative care recommends that each clinic observe a random sample of patients over a few days to get estimates on average time spent on counseling for targeted patient visits (i.e. depression visits) that could have been seen by a care manager. This information can be extrapolated to a total amount of time saved for an entire day's patient panel. Then one may take this time and divide by the average time per patient visit. This will give the number of extra patients that could have been seen. The next step is to multiply this number of patients by the average reimbursement rate per patient. This will give at least a crude estimate of the total amount of money that could be gained per day with the use of a care manager (CSI Solutions, 2013). As an example, a physician may spend one extra hour of time per day on counseling for his depressed patients. If an average patient visit at this clinic is 15 minutes in length, this one-hour of counseling time could translate into four more patient visits. At an average reimbursement rate of \$135 per visit, these four extra patient visits could equate to \$540 in gained revenue per day. This is assuming that 100% of saved PCP time translates into time spent with other patients.

Chapter 3: Data and Methods

To better understand how an integrated behavioral health model could be implemented at UTMB, we procured data on patient visits from UTMB primary care clinics. These clinics included four community-based clinics, two family medicine clinics, and two general internal medicine clinics, which included geriatric patients. The data set contained 8-months of new patient visits for each clinic stratified by sex and age. Assuming that new patient visits and first visits by existing patients were evenly distributed over the 12-month period, we multiplied these data by a factor of 1.33 to obtain the number of new or first annual patient visits for a 12-month period. Predicted 12-month depression prevalence for these clinics were calculated by multiplying prevalence figures by the number of predicted 12-month new patient visits.

Data on prevalence of depression was taken from the 2011 National Survey on Drug Use and Health (NSDUH) (SAMHSA, 2011). This survey examined the prevalence of Major Depressive Episodes as defined by the DSM-IV. Prevalence proportions were estimated separately by sex for the following age categories for each sex: 18-25, 26-49, 50-64, and 65+. These categories were chosen because they corresponded to the NSDUH reported aggregate data by age and the UTMB clinic data was provided for these same age categories. THE NSDUH technical report did provide additional age detail by sex and the prevalence data from the technical report was averaged within the specified age categories to produce final estimates. The original

detailed tables included prevalence by single years of age for the age group 18-25 and by five-year age groups for ages 26-64.

The NSDUH is sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA). The survey collects information on people living in households or noninstitutionalized group dwellings (i.e. dormitories and shelters), and civilians living on military bases. Participants in the 2010-2011 survey consisted of 137,913 respondents aged 12 or older and represented all 50 states including the District of Columbia. The Mental Health Surveillance Study (MHSS) was a clinical follow-up study that was a randomly selected subsample (n=1500) of those individuals who completed the NSDUH. Mental health clinicians asked participants via telephone if they had experienced a major depressive episode, as defined by DSM-IV criteria, over the past year (SAMHSA, 2011). Major depressive episode and major depressive disorder require the same diagnostic criteria. A major depressive episode may be part of a major depressive disorder or it may be a singular event.

Chapter 4: Results

To get a better understanding of the UTMB patient population, we obtained data on the total number of patients in the UTMB healthcare network and the total number diagnosed with diabetes, depression, and comorbid diabetes and depression. Diabetes was defined as type 1 or type 2 diabetes. Depression included both single and recurrent episodes, dysthymic disorder, and mood disorder in conditions classified elsewhere. Per records provided by the i2b2 database, the total number of patients in the UTMB

healthcare system was 1,197,500. The number of patients with diabetes was 52,503 and the number of depressed patients was 47,407. The number of patients with diabetes and depression was 10,314 (J.M. Starkey, May 27, 2014) meaning nearly 20% of diabetic patients also had a depression diagnosis. Among the UTMB patients diagnosed with chronic obstructive pulmonary disease (COPD), 37% also had a depression related diagnosis. Among patients diagnosed with coronary atherosclerosis (CAD), 28% also had a depression related diagnosis.

The i2B2 name stands for Informatics for Integrating Biology and Bedside and is supported by the Biomedical Informatics Resource at UTMB's Institute for Translational Science. The i2b2 query system returns the number of patients in the UTMB electronic medical records that meet the specified criteria. All data provided are deidentified.

Diabetes, COPD, and CAD were examined as indicators of common chronic medical conditions that provide some description of the general health of the community. Additionally, chronic physical conditions are often comorbid with depression. As discussed earlier in the IMPACT study, interventions such as an integrated behavioral health programs may be especially effective when populations have a high chronic disease burden.

As mentioned in the methods section, the study population consisted of eight UTMB primary care clinics: four community-based (CBC), two family medicine and two internal medicine. Most patients in the dataset were seen at CBCs (n=11797) followed by general internal medicine clinics (n=3934), and then family medicine clinics (n=3133). This trend was true for both men and women.

When examining patient visits across different age categories (Table 1), patients age 18-25 were seen most frequently at the CBCs (n=726), family medicine clinics (n=439), and general internal medicine (n=86). Those ages 26-49 were also seen most frequently at CBCs (n=1682) and roughly the same amount were seen at family medicine clinics and general internal medicine clinics (n=692 and n=636, respectively). Patients age 50-64 were seen most frequently at CBC clinics (n=1540) followed by general internal medicine clinics (n=1274), and family medicine clinics (n=855). For those age 65 and older, most were seen at general internal medicine clinics (n=1936) followed by CBCs (n=1753) and then family medicine clinics (n=996). These trends were roughly similar across gender. These data show that younger patients tend to be seen mostly at CBC and family medicine clinics while older patients are seen at internal medicine clinics.

	Ages				
	18-25	26-49	50-64	65+	Total
Males					
CBC clinics	276.6	610.5	555.9	768.7	5337.3
Family Medicine Clinics	138.3	224.8	300.6	365.8	1107.9
General Internal Medicine Clinics	45.2	232.8	557.3	798.0	1634.6
Females					
CBC clinics	449.5	1072.0	984.2	984.2	6459.8
Family Medicine Clinics	300.6	466.8	554.6	630.4	2025.6
General Internal Medicine Clinics	41.2	403.0	716.9	1138.5	2299.6
Total					
CBC clinics	726.2	1682.5	1540.1	1752.9	11797.1
Family Medicine Clinics	438.9	691.6	855.2	996.2	3133.5
General Internal Medicine Clinics	86.5	635.7	1274.1	1936.5	3934.1

Table 1: Estimated Number of Unique Patients Visiting UTMB Primary Care Clinics in 12 Month Period

Depression prevalence figures calculated from NSDUH data were as follows: men: 18-25 (5.7%), 26-49 (5.5%), 50-64 (4.9%), 65+ (1.5%); and women: 18-25 (11.0%), 26-49 (10.0%), 50-64 (8%), 65+ (2.6%). After applying these figures to the number of patients with at least one visit in the 12-month period (Table 1), we were able

to calculate the predicted number of patients with current depression who would visit the clinic at least once over a 12-month period (Table 2). When examining the estimated total number of patients with current depression, CBCs were the highest (n=349.1) followed by internal medicine (n=186.4), and family medicine (n=181.0). This trend also proved to be true across gender.

When examining predicted number of patients with current depression across different age categories, CBCs were expected to see the highest number of such patients across every age category. Family medicine clinics were expected to see the next highest number of visits for both 18-25 (n=40.9) and 26-49 (n=59.0) year-old categories. However, internal medicine clinics were expected to see the second highest numbers of visits in the 50-64 (n=84.7) and 65 and older (n=41.6) age categories. These trends were similar across gender. This shift in visits from family medicine to internal medicine after the age of 50 years reflects the predicted number of patients in table 1.

	Ages				
	18-25	26-49	50-64	65+	Total
Males					
CBC clinics	15.8	33.6	27.2	11.5	88.1
Family Medicine Clinics	7.9	12.4	14.7	5.5	40.5
General Internal Medicine Clinics	2.6	12.8	27.3	12.0	54.7
Females					
CBC clinics	49.4	107.2	78.7	25.6	261.0
Family Medicine Clinics	33.1	46.7	44.4	16.4	140.5
General Internal Medicine Clinics	4.5	40.3	57.3	29.6	131.8
Total					
CBC clinics	65.2	140.8	106.0	37.1	349.1
Family Medicine Clinics	40.9	59.0	59.1	21.9	181.0
General Internal Medicine Clinics	7.1	53.1	84.7	41.6	186.4

Table 2: Predicted Number of Patients with Current Depression Visiting UTMB Primary Care Clinics in 12 Month Period

The predicted total number of depressed patients across all clinics was 716.5 (Table 2). As discussed in the literature review, a typical caseload for each care manager

ranges from 90 to 150 patients. Thus we could expect the number of care managers needed to range from 5 to 8. Additionally, each full caseload requires 3 hours of supervision per week by a psychiatrist so we could expect 15-24 hours of supervision per week.

Chapter 5: Discussion

Behavioral health problems such as depression come at a significant burden to the U.S. population. This burden is reflected both in the population's health and in financial costs to the healthcare system and federal government. These figures reflect a behavioral healthcare system that is ineffective and has much room for improvement. Integrated behavioral health programs such as the collaborative care model have been shown throughout the literature to improve patient outcomes and reduce healthcare costs. Rather than referring patients to other providers or other locations for care, these programs bring specialty care to the patient via care managers. Care managers and a consulting psychiatrist help bring the best possible care to these patients while taking stress off of PCPs who are often ill-equipped to handle such patients.

Integrated behavioral health systems typically work best in managed care environments where cost savings to insurers are incentivized. Health care systems that operate mainly in fee-for-service environments face many more challenges when attempting to implement integrated programs. A major problem is the unknown costs associated with these programs. While the literature points out overall program costs per patient, there is little information regarding the break down of more specific costs such as

screening costs and transition costs. Another major challenge is how to obtain reimbursement for an integrated program. There are currently no widely accepted billing codes for care management services. Clinics must find creative ways to reduce staffing in other areas or negotiate more effective billing practices with insurers. Additionally, it is difficult to predict behavioral health screening reimbursements due to a daunting number of different insurance plans that each reimburses differently depending on region and hospital system.

Despite these challenges, it remains important for healthcare systems operating in fee-for-service environments, such as UTMB, to continue to investigate ways to move forward with integrated behavioral health programs. Given the substantial amount of research to support integrated behavioral health programs, hospitals owe it to patients to improve their quality of care. Implementing such a program is also important to hospitals because they will get a better understanding of their patient populations, develop more efficient workflows, and have a better understanding of how to negotiate contracts with accountable care organizations. Additionally, once the inevitable time comes when integrated behavioral health programs are incentivized or required, these hospitals will be able to make quick transitions into the new insurance environment.

When examining the main outcome of this study, the total number of predicted patients with current depression across all clinics, it is important to use caution due to several reasons. First, to get the predicted number of 12-month visits (table 1), we had to assume that first annual visits were evenly distributed across the entire period. This may not be accurate because patient flow through clinics can vary by time of year. Second, NSDUH depression prevalence figures were originally presented for each age 18-25 and

at 5-year increments thereafter until age 65. Because the age categories in this study were broader, we averaged the prevalence values across smaller intervals to come up with values to match our data. It is also important to note that data regarding the prevalence of depression is not uniform within the literature. Data varies according to the definition of depression, the sampling distributions, and the age intervals used. There remains no widely accepted methodology of reporting these findings. Though it was difficult to find comparable age distributions, our calculated depression prevalence values were similar to those found in the NHANES study with prevalence values of roughly 5% for men and 10% for women across ages 18-59 (CDC, 2012). Few major studies reported an age category of 65 and older. A review study on depression in older adults found the prevalence in communities within the U.S. and parts of Europe to range from 1% to 4% overall. When looking at both urban and rural populations of adults 65 and older within the U.S., the study found the prevalence of depression to be 1.4% for women and 0.4% for men. These estimates correlate with the large decrease in depression prevalence that we found in those 65 and older (Blazer, 2009).

The figures on staffing predictions also require caution upon interpretation. Predictions were based upon the assumption that care managers would only be seeing behavioral health patients. Currently, UTMB uses care managers for a variety of high risk, chronically ill patients. These same care managers would likely be expected to see behavioral health patients in addition to their current caseload. Thus one would expect a smaller panel of behavioral health patients for each care manager, which would require a larger number of care managers than we predicted. However, we would not expect an

increase in the number of psychiatric supervision hours as this depends on the overall number of behavioral health patients and not the number of care managers.

The results of this study should only be applied to the UTMB outpatient population as this was the target population for the study and the prevalence of depression can vary greatly depending on a multitude of factors within different patient populations. It is also important to note that the study focused mainly on the integrated behavioral health model present in the IMPACT study. While this model is one of the best known in the literature, other models do exist so staffing needs along with costs and benefits may vary according to which model is used.

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Vitae

Ernest Cochran, son of Ernie and Pat Cochran, was born in Paris, Texas on May 13, 1987. He attended Austin College graduating in 2009 with a B.A. in psychology. Afterward, he went on to attend Medical School at the University of Texas Medical Branch in Galveston, Texas. Upon graduation from medical school in 2013, he spent one more year in Galveston to complete a Master of Public Health and then went on to pursue a residency in Psychiatry in Phoenix, Arizona.

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