

The Patient Protection and Affordable Care Act's Early Impact on Disparities in
Access to Mental Health Treatment

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Abstract

Many of the provisions of the Patient Protection and Affordable Care Act (ACA) went into effect at the beginning of 2014, including bans on lifetime and annual limits, denial of coverage for preexisting conditions, mandates to provide coverage for “essential benefits”, and the initial expansion of Medicaid in states that have chosen to do so. Given the timeliness of the ACA and high prevalence of mental illness in the United States (20% of adults experience mental illness in their lifetime), this paper aims to explore the early effects of the ACA on treatment and alternative treatment utilization among a representative sample of the United States. Using data from the National Survey on Drug Use and Health (NSDUH), multivariate regressions and semi-elasticities were used to evaluate need and various socioeconomic demographic categories, and the effect of the law on individuals that fall within each category. It is shown that the ACA statistically significantly increased the relationship between severity of mental illness and the likelihood of receiving treatment. Poorer individuals (particularly the poorest with an annual family income less than \$20,000), the elderly (ages 65 and up), Medicare beneficiaries, and non-Hispanic Whites saw the greatest increase in likelihood of treatment following the ACA. Limitations include potential omission bias, specifically in relation to alternative treatment and lack of geographic indicators (particularly to control for States which did/did not expand Medicaid). Future studies will be valuable in continuing to evaluate the effect of the ACA on increasing access to mental health treatment, especially as efforts to coordinate care gain traction.

I. Introduction

“We have made progress expanding mental health coverage and elevating the conversation about mental health,” explained former President Barack Obama in May of 2016 in commemoration of Mental Health Awareness Month, but “too many people still do not get the help they need” (“Presidential Proclamation”, 2016). As healthcare reform continues to be a pertinent conversation in the United States, behavioral health has become a much more prominent part of the discussion. And, recent research has shown that this attention is appropriate. One in five Americans will experience mental illness throughout their lifetime, making it more prevalent than diabetes by over 10% (NIMH, 2015; National Center for Chronic Disease Prevention and Health Promotion, 2015). While the traditional somatic health system is well-understood by most policy makers, the behavioral health system maintains separate agencies and facilities than the physical health system. Further, policy around mental health and substance abuse are convoluted by continually changing standards of care and diagnostic criteria.

Policy reform has focused on parity, described as “a call for equal benefit coverage for mental and general medical disorders (Levin et al., 2004). The Patient Protection and Affordable Care Act (ACA), colloquially referred to as “Obamacare”, was a big step for policy makers because it posited that behavioral health screening and treatment were “essential benefits”. While this was an important step forward according to behavioral health advocates, worry remains that there are still gaps in treatment for mental health. These gaps are the focus of this paper. Given need, who is most likely to overuse, underuse, or misuse mental health treatment and alternative mental health treatment? Are their differences by race, ethnicity, socioeconomic status, age, and more? And, what has the ACA done to change any of these differences, if at all?

There has been significant focus on risk factors for mental illnesses and disparities in access to treatment. This paper will aim to incorporate this research to evaluate how the ACA

impacted the role of need in determining treatment status. Further, it will attempt to apply the existing knowledge to a very timely issue as the ACA continues to be one of the most controversial policy discussions in Congress. It will also explore access to alternative treatment, another difference to past literature. Because the ACA focused on increasing access to traditional treatment (covered by insurance), results for alternative treatment should provide wider context for mental health access in general and allow for comparison to trends for traditional treatment. Only a few researchers have attempted to quantify the early impacts of the law on behavioral health beyond increased access to insurance or look at alternative treatment access over time.

The rest of this section will provide the remaining introductory information, including a discussion of significance, the history of mental health treatment and policy, describe the important theories that are relevant and then summarize the gaps within the existing literature on the topic. Section 2 will outline the data and section 3 will describe the model. The model is a multivariate linear regression model using data from years 2008-2015 of the National Survey on Drug Use and Health (NSDUH). The results will be described in section 4. Finally, in sections 5 and 6, it will be argued that, despite many setbacks in the implementation of the ACA, it still made statistically significant, but practically small effects on the impact of most groups of people in receiving traditional, but not alternative treatment. Particularly, the poorest, those with greatest need, and unemployed individuals still in the labor force saw a practically significant increase in receiving treatment. Section 6 will also discuss limitations, including self-reporting, and implications for future research, including adjusting for the state and type of location of treatment.

A. Significance

According to the National Institute for Mental Health (NIMH), mental illness is the leading cause of disability in the United States and the world (World Health Organization, 2010).

Nearly 20% of adults (as stated earlier) in the United States experience a mental illness in their lifetime, though there is disparity by race, gender, and age (NIMH, 2015). Figure 1 below, created by NIMH provides an overall picture of mental health illness in the United States adult population (NIMH, 2015). Young people, females, and those who identify as multiple races are disproportionately affected by mental illness (NIMH, 2015). The figure displays the prevalence of any mental illness in 2015, which encompasses low or mild, moderate, and severe mental illness.

Nearly one in 25 adults live with a serious mental illness, defined by the federal government as having, during the past year, a diagnosable mental, behavior, or emotional disorder that causes serious functional impairment that substantially interferes with or limits one or more major life activities (NIMH, 2015). Studies have reported that serious mental illness causes a loss of approximately \$193 billion dollars in earnings per year in the United States (Roehrig, 2016). Individuals within the various levels of mental illness can have a variety of diagnoses, most recently outlined within the DSM-V, or the 5th Diagnostic and Statistical Manual of Mental Disorders (“DSM-5 – Important Changes,” 2013). These diagnoses include anxiety disorders, depressive disorders, bipolar disorder, autism spectrum disorders, attention deficit disorder/attention deficit and hyperactive disorder, borderline personality disorder, eating disorders, schizophrenia, posttraumatic stress disorder, obsessive compulsive disorder, dissociative disorders, psychosis, and more (“Mental Health Conditions,” 2017). This paper will not delve into various diagnoses and rather focus on need for treatment, which relates to all mental illnesses. In 2016, the Health Affairs journal, published a report on 2013 medical expenditures, which found that mental disorders were the costliest condition in the United States

(Holmes, 2016). The U.S. spent an estimated \$2.1 billion on mental disorders, making expenditures higher than those on heart conditions, trauma, and cancer (Holmes, 2016).

B. History of Mental Health Treatment

Treatment for mental illness is being constantly advanced and altered to reflect new research and knowledge. The history of treatment for mental illness began before the Common Era and has evolved as the understanding of the causes of mental illness have changed. Ancient world cultures believed mental illness was the result of the supernatural, most commonly possession by demons (Stanley, 2015). Treatment mainly involved creating a hole in the patient's skull to allow the supernatural to be released (Stanley, 2015). Between 500 and 300 B.C.E. the Greeks, led by Hippocrates, began viewing mental illness as the result of an imbalance of the four essential fluids (blood, phlegm, bile, and black bile) (Stanley, 2015). To treat patients, they used existing techniques such as bloodletting, purging, and phlebotomy (Stanley, 2015). Patients with these conditions were ostracized by their communities and often forced to either live in confinement or on the streets (Stanley, 2015). The stigma associated with mental illness, as well as attempts to separate them from society, has continued through modern times (Stanley, 2015). In the 15th century, the mentally ill were placed in madhouses, workhouses, and asylums because it was believed that their families did not have the capacity to help them (Stanley, 2015). Public madhouses were unkempt and most patients were abused and abandoned (Stanley, 2015). Treatments in the 15th century included bloodletting, shocking patients with icy or boiling water, sedatives, and physical restraints (Stanley, 2015). In the late 1800s, Phillippe Pinel and William Tuke advocated in Paris and America (respectively) for respectful, kind treatment of the mentally ill (Stanley, 2015). This was the beginning of the movement to deinstitutionalize mental health treatment (Stanley, 2015). Famously, Dorothea Dix

began the psychiatric hospital movement in America at the end of the 1800s (Stanley, 2015). Dix convinced the government to build 32 state psychiatric hospitals, which mainly continued the above mentioned treatments of physical restraints, shocking, sedatives, confinement, etc. (Stanley, 2015)

By the middle of the 1900s, psychoanalysis gained popularity following the publication of Sigmund Freud's teachings (Stanley, 2015). Freud's theories on the relationship between one's conscious and unconscious thoughts, led him to advocate for psychoanalysis (talking cures), and then free association (Stanley, 2015). At the same time as free association gained popularity, electroconvulsive therapy, psychosurgery, and psychopharmacology grew as treatment methods (Stanley, 2015). Many of these early methods were the precursors to today's use of prescription drugs and modified forms of electroconvulsive therapy to treat mental illness (Stanley, 2015). The introduction of drug treatment led people to believe that the mentally ill could be "cured", or at least could function in society, which led to deinstitutionalization in the middle of the 20th century (Stanley, 2015). In the 1960s, hospitals were replaced with community-based facilities for the mentally ill who needed treatment (Stanley, 2015). Along with these hospitals, the U.S. Community Mental Health Centers Act of 1963 was passed to improve the lives of the mentally ill in the United States (Stanley, 2015). However, many individuals who left inpatient mental illness facilities were unable to support themselves and became homeless (Stanley, 2015).

In the 1980s, over 100,000 mentally ill individuals were placed in jail (Stanley, 2015). Though imprisoning individuals for mental illness is no longer the standard of care, research shows that a disproportionate number of prisoners have a mental health illness (Stanley, 2015). According to the Bureau of Justice Statistics (BJS), over half of the prison population in federal,

state, and local prisons had a mental health problem (defined as a recent history of mental health symptoms recorded within 12 months prior to the study or a recent history of mental health problems including a clinical diagnosis or treatment by a professional), compared to only one fifth in the average population (James & Glaze, 2006). Over half of jail inmates reported symptoms that met the criteria of mania and over 30% had symptoms of major depression; female prisoners had significantly higher rates of mental illness (James & Glaze, 2006). However, only about one third of prisoners with mental illness received treatment while they were incarcerated (James & Glaze, 2006).

Current methods of treatment for mental health include psychotherapy (more commonly known as “talk therapy”) including techniques such as cognitive-behavioral therapy, exposure therapy, dialectic behavior therapy, etc; psychotropic medication; hospitalization (when necessary); support groups; and alternative methods of care including meditation, herbal remedies, workshops/groups, and acupuncture (“Mental Health Treatments,” 2013).

C. Current State of Mental Health Policy in the United States

The first federal Mental Health Parity Act (MHPA) was passed in 1996 and required comparable annual and lifetime dollar limits on mental health and medical coverage in large group health plans including employer-sponsored group health plans (Barry et al., 2010). In 2008, Congress enacted the Mental Health Parity and Addiction Equity Act (MHPAEA) reinstated MHPA and enacted additional requirements including extended parity to substance use disorder treatment (Barry et al., 2010). MHPAEA requires that all large group health plans and health insurers that already cover behavioral health benefits, provide equivalent financial requirements, annual and lifetime dollar limits, and treatment limitations to mental health and substance use disorder as to medical benefits (Barry et al., 2010).

Since the enactment of the 1996 law, 49 states have enacted individual state mental health parity legislation (Cauchi & Hanson, 2015). States vary significantly on the extent of these laws. Some mandated behavioral health benefit coverage, while others only expanded parity to substance use disorders or to state-provided coverage (Cauchi & Hanson, 2015).

The ACA is considered a significant step forward in behavioral health insurance benefits. Under the ACA, 62.5 million Americans were expected to gain access to insurance coverage for behavioral health including 32.1 million gaining new insurance and 30.4 million gaining additional benefits under existing insurance (Beronio et al., 2015). As of 2014, the ACA requires that behavioral health be included as a part of the Essential Health Benefits for all non-grandfathered plans in the individual and small group markets (Beronio et al., 2015). In addition, the law expands parity to the small group and individual markets, requiring that coverage for behavioral health be equal to that for medical treatment (Beronio et al., 2015). The law also requires no cost-sharing for these plans for mental health and substance abuse screening and disallows the ability of insurance plans to deny coverage due to preexisting conditions or in-state annual or lifetime limits on coverage (which disproportionately affected individuals with severe mental illness) (ASPA, 2013). Finally, Medicaid Alternative Benefit Plans will require equitable behavioral health coverage and Medicaid expansion should provide insurance coverage to significant numbers of poorer individuals, who are at higher risk of mental illness (ASPA, 2013).

In June 2016, Creedon and Cook published a paper on the effects of the ACA on both mental health treatment access and substance abuse (Creedon & Cook, 2016). They, too, used the National Survey on Drug Use and Health results, but evaluated the years between 2005-2014 (Creedon & Cook, 2016). They used difference-in-difference models to estimate changes over time for racial/ethnic groups (Creedon & Cook, 2016). Importantly, Creedon and Cook did not

control for socioeconomic status, in accordance with beliefs that doing so lowers disparity levels (Creedon & Cook, 2016). The model used in this paper will control for socioeconomic status, in order to determine the differences in effects of the ACA by income level. In their paper, Creedon and Cook found that mental health treatment access significantly increased following the ACA, but these differences did not reduce racial/ethnic disparities in treatment (Creedon & Cook, 2016).

Other than research published by Creedon and Cook, much of the evidence on the effects of the ACA on mental healthcare access has been based on anecdotal evidence and conjecture about the likely impact of specific interventions on certain at-risk populations, particularly the poor and those with severe mental illness. For example, two opinion pieces highlighted the effect of the ACA on poor individuals and those with serious mental illness. In an article in USA Today in January 2017, Jayne O'Donnell and Terry DeMio described the mother of two sons who was worried about the effects of a repeal of the ACA on her son who had been drug free for 6 months after receiving treatment paid for by Medicaid, particularly because of the loss of her first son a few years earlier to suicide (O'Donnell & DeMio, 2017). About 30% of Medicaid recipients have a mental illness compared to 20% of the overall population (O'Donnell & DeMio, 2017). A psychiatrist published an opinion piece describing her experience as a provider following the implementation of the ACA during which the most severely ill patients gained access to insurance (Izenberg, 2017). Before the ACA, those with severe mental illness were usually denied coverage or, due to difficulty keeping a stable job with their condition, lacked steady health insurance (Izenberg, 2017).

While these anecdotal vignettes provide insight into the human reality of mental health coverage before and after the ACA, past mental health policy reform in the United States has

produced mixed results in increasing treatment use. State mental health parity and mandated insurance coverage laws provide important insights into the potential success and failures of the ACA. Research on state laws has produced mixed results, but most have showed no statistical significant increases in use of mental health care following implementation of almost all kinds of state laws (Cauchi & Hanson, 2015; Pacula & Sturm, 2000; Busch & Barry, 2008; Buchmueller et al., 2007; Wen et al., 2013; Bao & Sturm, 2004).

Using the Medical Expenditure Panel Survey-Insurance Component between 1997 and 2003, researchers looked at variation in state parity laws and its effect on mental health coverage (Buchmueller et al., 2007). They found that the Employee Retirement Income Security Act (ERISA) and other exemptions, such as those for small firms, reduced the number of employees covered by state laws by about half (Buchmueller et al., 2007). ERISA exempted all self-insured plans and was the cause for most of the reduction in impact for state laws (Buchmueller et al., 2007). Other researchers found that state parity legislation produced no significant increase in use of services using household surveys, the Health Care for Communities Study, and other national surveys (Bao et al., 2004; Pacula & Sturm, 2000; Busch & Barry, 2008). Further, there have been mixed results on whether state parity legislation is correlated with a significant decline in suicide rates (Sipe et al., 2015). The researchers all mainly blame the lack of success of this legislation in producing the desired outcome because of significant exemptions including employees of small firms, employees exempt due to ERISA, and individuals who simply lacked insurance at all.

Pacula and Sturm concluded that strong federal legislation could alter the results of parity legislation, especially if it provided more coverage to individuals (Pacula & Sturm, 2000). The ACA's expansion of Medicaid, insurance mandates for employers and individuals, subsidies for

low-income individuals, a ban of denial of coverage or lifetime limits, and the requirement that behavioral health is covered by an essential benefits package are believed to be important differences in improving legislation outcomes in increasing treatment access (ASPA, 2013). Further, one of the problems highlighted in research is the disjointedness of the mental health, substance use, and physical health systems despite their significant clinical overlap. The ACA's focus on Accountable Care Organizations, medical homes for Medicaid, and other methods of care coordination differ from past attempts at policy solutions.

D. Related Health Economics Theories

Traditional economic theories rely on the assumption of rational actors and an understanding of the kind of competition that exists in the market. The healthcare market, alternatively is composed of consumers with limited information, who often “make choices in the context of fear, urgency and trust in an expert” (Frank, 2004). Further, professional norms and consumer habits play a much larger role in healthcare decisions than in decisions within other sectors (Frank, 2004). Ultimately, this is important to understand when attempting to model any choices related to healthcare, as well as the shortfalls of most models that relate to the healthcare market.

Frank describes the research of behavioral economists and psychologists that can be applied to physician decision-making, addiction, and demand for healthcare and insurance (Frank, 2004). Of particular relevance, is Frank's discussion of underuse, overuse, and inappropriate use of care by consumers, which is important for determining healthcare efficiency and quality (Frank, 2004). In the context of this paper, underuse refers to individuals who need, but do not receive treatment for mental health care. Overuse or inappropriate use of care refers to those who do not need, but receive mental health treatment. In general, policy solutions are focused on the former group: those who underuse existing resources (Frank, 2004). These

individuals are of particular importance to government officials because they can often require emergency care or inpatient care, costing a much higher amount to the state, because they did not receive preventative care or regular treatment. Underutilization of care, or inefficiently low demand, can be caused by both supply and demand-side factors. Theories of under-provision focus on perverse incentives for physicians (Frank, 2004), which are less relevant when looking at demand-side problems. This discussion will focus on the demand-side theories because this paper focuses on the characteristics of the patients and how that influences their treatment-seeking behavior. Original explanations of low demand for healthcare focused on externalities such as lack of insurance or financial barriers (Frank, 2004). The ACA aimed to remove many of those externalities, especially for mental health by requiring a minimum amount of coverage for most individuals, including mental health coverage (ASPA, 2013). However, even with a fully insured population, under-use remains. Other economists have tried to explain this using various models.

One such model adds stigma to the demand function, giving it a role similar to price (Frank & McGuire, 2000). Another model uses the psychological expected utility model, in which mental states affecting utility are influenced by both beliefs and observed outcomes (Frank, 2004). There is a trade-off between seeking treatment and obtaining information (Frank, 2004). Some individuals may have more anxiety without all the information about their condition, while other patients may have more anxiety from having a doctor tell them the diagnosis (Frank, 2004). This may impact their desire to seek treatment and the amount of information they share with a provider even if they do seek treatment (Frank, 2004).

Still, others explain that demand functions that treat healthcare as a “want” or even a willingness to pay (effective demand), fail to accurately model desire for healthcare (Parkin,

2010). For example, a patient likely does not want surgery or to have a cast on their arm. Instead demand should be modeled by an individual's "need", defined as an ability to benefit from the treatment (Parkin, 2010). This is the theory that underlies the model used in this paper. Further, posited in the model (described later) is the idea that individual need should determine treatment status, rather than individual desires or other externalities.

Ultimately, economic analysis for the provision of public goods focuses on efficiency and equity. Pareto efficiency and technical efficiency, the usual concern for economists in markets, are of little relevance in healthcare because they do not account for social utility and desires (Parkin, 2010). The optimal amount of healthcare for society may not be the amount at which no one can be made better off without making someone else worse off (Pareto efficient), or where all production is maximized (technical efficiency) (Parkin, 2010). Rather, social efficiency and equity are of most concern to healthcare policy makers (Parkin, 2010). These are both harder to measure and harder to mandate, but should also arguably be the aim of healthcare reform. By understanding differences in socio-demographic characteristics' influence on treatment status is, researchers can inform policy makers about the challenges underlying social inefficiency in the healthcare system.

E. Disparities and Inequities in Mental Health Illness and Treatment

Recently, public health officials have given special attention to disparities and inequities in both illness (prevalence and incidence), as well as rates of treatment. In the book, "Mental Health Services: A Public Health Perspective", Levin et al. (2010) describes the recent literature on disparities in mental illness, severity of illness, access to treatment, and outcomes (Levin et al. 2010). Most descriptions of health disparities fail to come to a single definition. Levin et al. explains that the terms health disparity, inequality, and inequity take on a variety of meanings in

the literature (Levin et al. 2010). The National Center for Biotechnological Information (NCBI) of the National Institutes of Health (NIH) also recognizes the varying uses of the terms disparities, inequities, and inequalities, which stems from a variety of causes including location differences and variation in beliefs about what is unjust and avoidable (Dehlendorf et al. , 2010). The Institutes of Medicine, in their 2002 report “Unequal Treatment: Confronting Racial and Ethnic Disparities in Healthcare” described a widely used definition of health disparities: “differences in the quality of health care that are not due to access-related factors or clinical needs, preferences or appropriateness of intervention” (as cited in Dehlendorf et al. , 2010). It is important to note that this report focused on disparities in quality of care, but has been widely used when discussing access to care. Though not perfect, this definition has been widely accepted and will be used throughout this paper. Researchers, including Cook, the author of the 2016 report on the impact of the ACA on access to behavioral health treatment advocate that this definition mandates that differences, like socioeconomic status and educational status, must not be controlled for in order to fully understand disparities between race (Cook et al., 2012). Because the goal of this paper is to look at differences across income groups, racial groups, levels of education, marital status, etc, these “controls” will remain in the model.

Health disparities have been a major focus of many federal agencies, including the Agency for Healthcare Research Quality (AHRQ), the Institutes of Medicine (IOM), the Centers for Disease Control (CDC), and the Office of Disease Prevention and Health Promotion (ODPHP), among others. Disparities in levels of mental illness and access to adequate treatment continue to be studied. The existing literature shows that race, income, age, sex, insurance status, and substance disorder comorbidity are all statuses on which a person’s level of mental illness and/or access to treatment will likely vary. In addition, military and jail status are important

indicators of disparities in levels of mental health illness, while educational achievement and rural status impact access to treatment.

Racism is one of the more well-documented sources of mental illness and treatment disparities. In general, researchers believed that due to increased stress and illness of minorities, they would be more likely to experience mental illness (McGuire & Miranda, 2008). However, empirical studies proved otherwise (McGuire & Miranda, 2008). Almost all racial and ethnic minorities reported lower rates of lifetime mental disorder than white individuals in the United States (McGuire & Miranda, 2008). However, black individuals reported higher prevalence of schizophrenia, American Indians were at higher risk for post-traumatic stress disorder (McGuire & Miranda, 2008). Further, while Blacks and Hispanics report fewer cases of mental illness, they report more severe disorders and a greater number of symptoms (McGuire & Miranda, 2008). An individual's race is more directly linked with access to care (McGuire & Miranda, 2008).

According to a report by the Surgeon General in 1999, minorities have less access to mental health services, are more likely to forgo needed care, and are less likely to receive adequate care when they seek treatment (as cited in McGuire & Miranda, 2008).

Socioeconomic status is closely correlated with race/ethnicity, which complicates studies on disparities in mental illness and access to treatment. In general, those with poor economic status tend to suffer from higher rates of mental illness (CBHSQ, SAMHSA, HHS, & RTI International, 2016). Individuals with the lowest and highest incomes tend to seek treatment most often (CBHSQ, SAMHSA, HHS, & RTI International, 2016). Consequently, Medicaid/CHIP insurance holders or those with other/multiple insurance types tend to receive treatment for any mental illness most often (Walker et al., 2015). Medicare beneficiaries tend to receive treatment least often, followed by individuals with private insurance (CBHSQ, SAMHSA, HHS, & RTI

International, 2016). In general, having any type of medical insurance is significantly correlated with mental health treatment use whether or not an individual had a mental illness in the past year (Walker et al., 2015). Education is also closely related to socioeconomic status. High educational attainment, like high socioeconomic status was correlated with likelihood to initiate mental health care (Cook et al., 2014).

Age, sex, marital status, employment status, health status, and substance use disorder comorbidity have all also been found to significantly impact an individual's likelihood of having a mental health disorder and/or seeking treatment. According to Kessler et al., women had significantly higher risk than men of anxiety and mood disorders, while men had higher risk of impulse control and substance use disorders (Kessler et al., 2005). Males have been found less likely to be willing to seek treatment for mental health disorder than females (Gonzalez et al., 2005). Young adults report the highest rates of mental illness of all adults above 18 years of age (CBHSQ, SAMHSA, HHS, & RTI International, 2016). Studies have found that being younger is correlated with less adequate care (Cook et al., 2014) and less willingness to seek treatment (Gonzalez et al., 2005). Further, as age increases, receiving treatment given any mental illness in the past year also increases, but only until age 60 (Wang et al., 2005). Elderly adults are generally undertreated for mental illness (Wang et al., 2005). Marriage disruption (separation, divorce, or widowed) correlate with higher rates of behavioral health disorders, but its impact on treatment seeking is less well understood (Kessler et al., 2005). Underemployment (part-time or unemployed) tends to be correlated with increased mental health disorders (CBHSQ, SAMHSA, HHS, & RTI International, 2016). Further, having a full-time job is correlated with inadequate treatment (Cook et al., 2014). People living in rural areas or in highly populated cities tend to have less access to healthcare in general, including mental healthcare (Wang et al., 2005). Poor

somatic health and poor mental health are closely correlated (WHO et al., 2004). As comorbidity of illness increases or becomes more severe, it is related to increasing treatment seeking (Cook et al., 2014). Patients with both substance use and mental health disorders are called patients with “dual diagnosis”

Behavioral health professionals have more recently begun to address the phenomenon of dual diagnosis, or the idea that substance-use disorder and mental illness are closely linked. Mojtabai et al. (2014) found that individuals with comorbid disorders tended to report greater use of mental health services than those with only alcohol-dependence or both alcohol and drug dependence, but they also reported higher unmet need for these services (Mojtabai et al., 2014). Barriers to mental health care were found to be similar for those with and without comorbid substance dependence; the most common barrier was the cost the cost of treatment, especially for those who lacked insurance coverage (Mojtabai et al., 2014).

Lastly, there is concern that serving in the military increases risk for mental illness, especially post-traumatic stress disorder. Suicide rates in the military began to rise after 2004, overtaking the civilian suicide rate by 2009, but the mechanisms causing the trend are still being researched (Schoenbaum et al., 2014).

F. Gaps in the current literature

There is a common belief that physicians swear to one of the main principles of medical ethics, “First, do no harm” when they take the Hippocratic Oath. While the phrase is actually not within the Hippocratic Oath, it is still one of the guiding principles in medicine. This phrase is usually used in reference to avoiding overtreatment. While physicians now use this as a guiding principle in weighing the benefits and harms of treatment, its application to mental health treatment is less well-defined.

In mental health treatment, many experts believe more is better, but advocate for evidence-based, individualized approaches to treatment (Penfold, 2017). Individuals in the U.S. range from individuals who seek counseling without a “diagnosable” mental illness, or individuals who would not consider mental health treatment for a variety of reasons (such as stigma, affordability, or simply lacking knowledge about how to seek help). This can make self-reported “need”, the most common measure for need for mental health treatment in the literature, an inaccurate measure.

Sentell et al. (2007) used the California Health Interview Survey for their study on the effect of English language proficiency and race on access to mental health treatment (Sentell et al., 2007). To indicate need, the researchers used the survey question: During the last 12 months, did you think you need help for emotional or mental health problems, such as feeling sad, blue, anxious, or nervous?” (Sentell et al., 2007). This measure fails to consider the stigma associated with needing mental health treatment and the lack of information individuals, especially those with low health literacy, may have about when to initiate mental health care. This paper should help isolate individuals who needed healthcare and did or did not receive treatment in order to better understand the ACA’s effects in accomplishing its goals.

This paper will also use most of the control variables utilized in other studies, but will also add in comorbidity for substance use and military status in order to help control for factors that correlate with an individual’s likelihood of having mental illness and receiving treatment. In addition, this paper is timely: it attempts to address one of the most controversial current policy discussions. While many researchers looked at the expected benefits of the ACA on behavioral health, few papers have attempted to quantify the early impacts of the law beyond levels of

insurance coverage. This paper will add to the literature by looking at the impact of the ACA on reducing disparities in access to mental health treatment.

The aim of the following sections is to describe the methods by which the NSDUH was used to explore changes in mental health treatment access following the ACA. In order to more comprehensively approach treatment access, both treatment and alternative treatment will be considered. Particularly, the aim is to determine if need became a more important factor and if there were any meaningful differences in disparities in treatment or alternative treatment access following the ACA in comparison to prior to the law's enactment?

II. Data

SAMHSA, the Substance Abuse and Mental Health Services Administration, is the agency within the United States Department of Health and Human Services that works to improve behavioral health within America (Elliot, 2013). The Center for Behavioral Health Statistics and Quality (CBHSQ) within SAMHSA has been sponsoring and publishing the National Survey on Drug Use and Health annually since 1971, though the exact methods have been updated to incorporate modern technology and adapt to researching needs (HHS, 2013). The survey is conducted by RTI International in North Carolina (HHS, 2013). Currently, the survey collects cross-sectional data through face-to-face interviews with a representative sample of the United States population at the person's place of residence (HHS, 2013). The data collection excludes homeless individuals that do not use shelters, active military members, and residents of institutions (including jails and hospitals) (HHS, 2013). Most variables correspond to individual answers to each question of the survey (HHS, 2013). The NSDUH also provides statistically imputed variables and recoded variables based on both the imputed and non-imputed variables (HHS, 2013).

Need was defined using a variable that SAMHSA created for the 2008 sample and revised for the 2012 sample (HHS, 2013). This variable, “SMIPP_U” predicts the probability the respondent has a severe mental illness using a multivariate logistic regression combining short scales that evaluate an individual’s psychological distress and functional impairment (HHS, 2013). Mild, moderate, and severe mental illness were defined based on cut-off points the NSDUH set based on “SMIPP-U” values (HHS, 2013).

The short scales for evaluating psychological distress and functional impairment were performed by trained mental health clinicians through a clinical follow-up (HHS, 2013). In 2008, the first year of the study, 1,500 respondents participated in the clinical follow up (HHS, 2013). In 2008, half of the respondents were given a shorter, revised version of the World Health Organization Disability Assessment Schedule (WHODAS) and half were given the Sheehan Disability Scale (SDS) to assess functional impairment (HHS, 2013). It was determined that the WHODAS was a better predictor of SMI, so multivariate regression utilizes only this measure of disability (and only WHODAS was assessed from 2009 forward) (HHS, 2013). Psychological distress was measured using the K6 screening instrument for nonspecific psychological distress, which was included in the computer-assisted interviewing instrument (HHS, 2013).

Beginning in 2010, SAMHSA began efforts to improve the SMI prediction model and they began utilizing a new model in 2012 based on this research (HHS, 2013). The “2012 model”, as it is described, is a multivariate logistic regression using an individual’s WHODAS score, K6 score, ages, and two binary variables indicating whether an individual had a major depressive disorder and/or serious thoughts of suicide in the past year to predict mental illness (HHS, 2013). The NSDUH recodes these variables to denote which respondents had any, mild or moderate, or severe mental illness based on the values in the multivariate regression (HHS,

2013). Instead of using these recoded binary variables, the model in this paper will utilize the actual respondent's value as the "need" variable (HHS, 2013). All of the years between 2008-2015 are based on the "2012" model (HHS, 2013).

Imputation-revised variables were used whenever possible (a comparable version existed for all years between 2008-2015). If the imputed versions did not exist for all years, the non-imputed variable was used and observations were dropped if variables were missing values for any of the demographic categories. Very few observations due to most variables, with the exception of alternative treatment and substance use disorder comorbidity-related variables. Discussion of the possibility for bias is below. Variables that contained multiple categories are defined using multiple dummy variables. Table A1 within the appendix indicates the variables from the NSDUH codebook and how they were used within the model.

A. Sample

Each year of the NSDUH public-use file includes between 55,000-58,000 observations for individuals 18 or older, for a total of 448,899 observations between 2008-2015. A total of 447,478 (99.7%) people reported whether or not they received traditional treatment and a total of 435,085 (96.9%) reported about their status of alternative treatment (1,421 and 13,815 people either refused to report or reported that they did not know if they had received traditional mental health treatment and alternative mental health treatment respectively). Further, individuals were excluded if they refused to report or reported they did not know as an answer to any of the questions that were not imputed. Very few individuals (usually less than 10) refused/did not know for any of the non-imputed variables other than those related to substance use disorder comorbidity. Because recoded variables of drug and alcohol abuse/dependence were based on responses to many questions that could be considered sensitive, it is reasonable that

many individuals do not have conclusive values for this recoded variable. However, it is worth noting that individuals who refused or did not know the answer to any of the questions related to substance abuse/dependence likely have more stigma against these kinds of conditions. Therefore, they are less likely to receive treatment for substance use and likely mental illness as well.

Tables 1 and 2 describe the differences between those who gave a definitive response to whether they had received treatment and alternative treatment, respectively, and those whose responses were recoded as “missing”. Because the sample size is relatively large, we expect many p-values to be significant. Therefore, while so many of the p-values are significant at the 1% level, many key indicators, such as levels of mental illness are not significantly different across the groups. Severe mental illness is the only level of mental illness with a significantly different mean between the groups with known and unknown treatment status (at the 1% level). Notably, the percent of respondents with family income between \$20,000 and \$49,999 is not significantly different. Those who did not respond with their treatment status were more likely to be of a minority race/ethnicity, female, lower education status, never married, report excellent/good health, and have public insurance. Table 2 provides a similar view, but in relationship to those with missing alternative treatment status. Because so many more individuals were dropped due to missing alternative treatment status, these differences are of particular importance for evaluating non-response and omission bias. Notably, the difference in means increases as severity of mental illness increase for those with any mental illness and the difference in means is both statistically and practically large. This is important to note because it means that the omission bias could impact the results of analysis with alternative treatment as the outcome variable. For example, it could mean that the number of those with severe mental illness

in the whole NSDUH sample is significantly higher than the percentage included in the sample included in the analysis. This would limit one's ability to draw conclusions from regressions using alternative treatment as the dependent variable. The 13,815 (4.09%) who were not included in the analysis are more likely to be white, older, have lower educational attainment, and have poorer self-reported health.

Descriptive statistics of the sample are in Tables 3 and A2. Table 3 compares the means of those who received treatment to those who did not receive treatment for each variable of interest. Table A2 does the same, but uses alternative treatment. Within the sample, 48,732 (13.9%) received "traditional treatment" and 301,123 (86.1%) did not receive "traditional treatment". Traditional treatment is defined as inpatient, outpatient, or drug treatment. Sources of alternative treatment (defined by the NSDUH) include acupuncturist or acupressurist, chiropractor, herbalist, in-person support group or self-help group, internet support group or chat room, spiritual or religious advisor such as a pastor, priest, rabbi, telephone hotline, and/or massage therapist". Within the sample, 19,347 (5.7%) individuals had alternative treatment in the past year and 318,114 (94.3%) individuals did not.

The mean of treatment for the entire sample was 0.139, while that of alternative treatment was .057. This means that for the entire sample across all years, about 13.9% of individuals received mental health treatment and about 5.7% of individuals received alternative treatment. The p-values displayed in this table are those for a t-test comparing the mean of treatment for the specific variable to the mean of treatment for the whole sample. For traditional treatment, all means are statistically different from the sample mean except for the percentage of people who abuse both alcohol and drugs, the percentage of unemployed, and those with the highest incomes. Of importance to note, is that the difference in means show that the sample generally

follows past predictions about disparities in mental health treatment use. Blacks, Hispanics, and other minorities or multiracial individuals are less likely to receive treatment; females are more likely to use treatment than males; the youngest (18-25) and oldest (65+) receive less treatment than those age 26-64; individuals with total family incomes between \$20,000-\$49,999 (middle income) individuals are less likely to seek treatment than the poorest and wealthiest; higher education relates to more treatment use; and patients with comorbid substance use disorders show higher rates of treatment. There are a few exceptions to expectations: a significantly higher percentage of employed individuals did not receive treatment; and, among those who are married and single, a higher percentage did not receive treatment, while the opposite was true for separated individuals. Because employed individuals include both full and part time, this could account for the difference in the sample from empirical literature. Marriage and separation is believed to be correlated with higher prevalence of mental illness, but its relationship with treatment seeking is still uncertain, so this could be a point for future review.

Table A2 compares groups who did/did not receive alternative treatment in the past year. Similar to the past tables, the sample size likely increases the number of statistically significant results. This table supports the hypothesis that higher need is associated with higher alternative treatment rates. Further, those who have had alternative treatment in the past year included more individuals who were white, female, middle-aged (26-49), employed, wealthier, more well-educated, married, and have more severe alcohol or drug disorder comorbidity. These patterns are generally consistent with conjecture, which generally posits that those who are likely to receive alternative treatment are well-educated, wealthier, and white.

In addition to comparisons of means by treatment and alternative treatment status, Table 4 provides a comparison of means of the treatment and need variables before and after the ACA

and Table A3 (in the appendix) contains the remaining variables used to inform the model. Importantly, need remained fairly constant (based on all of its measures) before and after the ACA. Further, while many of the difference in means are statistically significant, only 4 of the 47 control variables evaluated change by more than 10%. Interestingly, the mean of treatment actually drops significantly following the ACA for traditional treatment, but there is not significant different in alternative treatment before and after the ACA. These descriptive tables do not hold other factors constant, so the drop could be due to differences in the samples before and after the ACA (especially since that after the ACA was significantly smaller). The goal of the model is to more rigorously explore the combination of all of the comparison of means to evaluate the effect of the ACA on the importance of need (and other socio-demographic characteristics) on the likelihood of receiving mental health treatment.

III. Model

In order to evaluate my question, I used four separate models all with the general form:

$$\text{Treatment}_{it} = \beta_0 + \beta_1 \text{need}_{it} + \beta_2 \text{afterACA}_t + X_{it} \beta_3 + \beta_4 \text{need}_{it} \cdot \text{afterACA}_t + X_{it} \cdot \text{afterACA}_t \beta_5 + u_{it}$$

where Treatment, the outcome of interest, is an indicator of whether an individual did or did not receive treatment in year t, need is a measure of the severity of mental health condition which signifies need for mental health treatment, “after ACA” is an indicator of years after provisions of the ACA specified in the introduction were implemented, and X is a vector of controls that includes race, age, marital status, gender, insurance status, income, education status, work status, education status, marital status health insurance status, past/present military status, substance abuse or dependence comorbidity.

The first form of the model used levels of need, or levels of severity of mental health, defined by the NSDUH (mild, moderate, and severe mental illness). The model was repeated with Alternative Treatment as the outcome of interest, an indicator of whether or not the individual received alternative mental health treatment (defined by NSDUH and discussed later) in the past year.

The second form of the model includes a linear and a quadratic term for need. Figure A1 within the appendix shows the distribution of need, which is highly skewed right. Because need is skewed, the “cut-off points” for each level of mental illness are unevenly spaced, and the likelihood that need and treatment do not relate with a linear relationship, a quadratic term was added. Once again, second form was applied with both treatment and alternative treatment as the outcome of interest.

IV. Results

The coefficients and their p-values within the model indicate the level of importance of each variable in determining an individual’s likelihood of getting treatment given that all other variables are kept constant. The interaction terms between each of the variables and the dummy variable for the ACA’s implementation, indicate whether there is a difference in that variable’s effect on likelihood to receive treatment before and after ACA. For example, if the coefficient on married is significant, it means that married individuals are significantly more or less likely (depending on the sign of the coefficient) to receive treatment than single or separated individuals before the ACA. If the interaction term between married and after ACA (“Married x After ACA”) has a statistically significant coefficient, it means that there is a significant difference between the effect of marriage on receiving treatment before and after the ACA.

Need and most of the control variables are highly significant in all of the models. This is unsurprising given the large size of the sample. It makes sense that need and most of the controls are statistically significant because the likelihood of seeking help increases as severity increases and the controls used have all been deemed important in determining mental health status and/or treatment seeking in the existing literature. Because the values of the coefficients are statistically significantly different from zero, but many actually portray very small numerical changes, another method was also used to evaluate the effects of the ACA on likelihood of receiving treatment. Elasticities (for need and need squared) and semi-elasticities for the dummy variables were calculated, giving percentage changes in the probability of treatment. The final column displaying the difference in elasticities, are interpreted as the percentage change in the independent variable's impact following the implementation of the ACA, in reference to the excluded group. For example, the "Other Race" category is excluded from the regression to prevent collinearity. Therefore, the values for elasticities for White (non-Hispanic), Black (non-Hispanic), and Hispanic must be evaluated in reference to "Other Race".

Analysis on the impact of the ACA and of various disparities on the likelihood of alternative treatment showed little impact of the law. Because results from these regressions do not show a significant impact of the ACA, elasticities were not calculated. However, there were a few notable results. Particularly, income's effect on likelihood to seek alternative treatment was significantly reduced following the ACA for family incomes below \$75,000 (in comparison to those over \$75,000). Because so few individuals received alternative treatment in the sample and its impact was negligible, results are included in the appendix in Table A6.

Prior to completing full analysis, regressions of the dependent variables (treatment and alternative treatment) on "After ACA" were completed. The results show that treatment rates

increased statistically significantly after the ACA for traditional treatment, but insignificantly for alternative treatment. (treatment: .012 (0.000***), alternative treatment: .001 (0.263)). Further, when need was added in both of its forms, the results followed the same pattern. Therefore, without controlling for any sample characteristics, the ACA appears to significantly impact rates of traditional, but not alternative treatment. Similar findings are explained below.

Table 5 gives the results for the need variables from both models. Before the ACA, those with any mental illness (mild, moderate, or severe) were significantly more likely to receive treatment than those with no mental illness. Serious mental illness was associated with about a 350% increase in likelihood of receiving treatment compared to those with no mental illness before the ACA.

Before the ACA, need and treatment are significantly positively correlated, while need squared and treatment are negatively and significantly correlated. This shows that the likelihood of receiving treatment based on need increases at a decreasing rate, meaning the relationship does fit well as a quadratic relationship.

Table 6 provides the results of the models for all of the non-need variables. As expected almost all of the controls have significant impacts on rates of treatment, and comply with expectations of disparities in mental health treatment. For example, whites are significantly more likely to receive treatment and blacks and Hispanics are significantly less likely to receive treatment in comparison to those of other races before the ACA. Further, all ages below 65 are more likely receive treatment and those who have annual family incomes below \$75,000 are less likely to receive treatment than the wealthy before the ACA. As expected, prior to the ACA, comorbidity was associated with higher rates of treatment, and those with less education were less likely to receive treatment.

The elasticities and semi-elasticities provide information about how each specific category was influenced by the law in comparison to the group excluded from the regression. Table 5 shows that those with any mental illness were practically significantly affected by the ACA in comparison to those with no mental illness, but the actual increase within their groups is quite small. After the ACA, those with moderate or serious mental illness increased their likelihood of receiving treatment by 18% more than those with no mental illness. However, the change in need following the ACA is given by an elasticity of both need and need squared, rather than a semi-elasticity. Elasticities give the percentage change in treatment given a 1% change in the independent variable (rather than a the percentage change in treatment given a 1 unit change in the independent variable or a percentage point change). Evaluated at the mean, the elasticity of need (which includes need squared) increased from 0.582 to .609, for a change of .027. Ultimately, there was a minimal change in the importance of need (less than 10%) on the likelihood of receiving treatment following the ACA. This means that while those with mental illness were affected significantly more by the ACA than those with no mental illness, the actual increase in access to treatment following the law as small.

Table 6 provides the semi-elasticities for the control variables. Interestingly, the results for age and insurance show that adults above 65 years of age and those on Medicare increased their likelihood of treatment most in comparison to younger adults and those with other sources of insurance. Following the ACA, private insurance is correlated with a 7.5% increase in likelihood of receiving treatment, while Medicaid only increased the likelihood by 1.4%. In contrast to the above results related to insurance and age, those with the lowest family incomes (below \$20,000) saw the greatest improvement in treatment access following the ACA. Interestingly, both employed and unemployed individuals had particularly large percentage

increases in treatment following the law in comparison to individuals not in the labor force, at 10% and 16% respectively. Finally, it is important to note that the groups that are left out of within the category of substance abuse disorder comorbidity are those with more than one of the listed conditions (such as alcohol and drug dependence). Therefore, the large negative results do not indicate alarm that the ACA decreased these individuals likelihood of receiving treatment, but rather that those with higher levels of comorbidity were more greatly impacted.

Tables 7 and 8 give the results of two forms of F-tests for the two difference models. The test of joint significance display that all of the categories of independent variables are jointly significantly impacted by the ACA in regard to traditional treatment, but not alternative treatment. The tests labeled “Equal Effect” are tests of whether the ACA has a homogenous effect in relationship to each variable within a category (all in reference to the excluded group). None of the tests of equal effect are significant at or below the 5% level. Therefore, it can be concluded that the ACA’s impact on all respondents are not statistically different based on the severity of their mental illness compared to those with no mental illness. Together, these tests indicate those with mild, moderate, and severe mental illness were significantly and homogeneously more likely to receive treatment following the ACA in comparison to those with no mental illness. Interestingly, income is only jointly significant at the 10% level and the findings show that the impact of the law was homogenous across incomes in comparison to the most wealthy.

Table 8, like Table 7, only assesses the impact of the categories most likely to have a differential effect following the ACA. The results, once again, show that need, race, age, insurance, income, and employment status are each jointly significant. The effect of each variable within the categories of race and insurance were statistically significantly and differently

affected by the ACA. Therefore, the ACA affected Whites, Blacks, and Hispanics in their access to treatment differentially in comparison to those of other/multiple races. The effect of each variable within the categories of age, income, and employment on a difference in likelihood to receive treatment following the ACA were homogenous in comparison to the left out group. For example, those within age groups below 65 and over, experienced similar impacts by the ACA in comparison to the elderly.

Figure 2 provides a visual representation of the relationship of both models of need and their impact on treatment. The blue curve's upside-down U-shape shows that need's impact on treatment is, in fact, well-represented with an added quadratic term. The levels of need are shown by the red lines, which match closely to the blue curve. Comparison of the two exemplifies that the two representations of need and the two models are compatible.

Overall, the tables contribute to the conclusion that research existing about disparities in access to mental health treatment continues to uphold. The ACA statistically significantly affected how much an individual's need influenced their likelihood of receiving treatment, especially for white, lower-income, unemployed individuals, with Medicare or private insurance. The two models showed similar results for tests of joint significance, but differing and therefore inconclusive results for tests of equal effect. The models are robust because they give very similar results, both in coefficients and significance, though differences in the F-test results are cause for discussion.

V. Discussion

A. Major Findings

The goal of this paper was to uncover if and for whom the ACA increased access to mental health treatment. The results described above show that need did become a more

important factor in determining treatment status. However, while results were significant, the increase in treatment determinant on specific sociodemographic factors was only practically significant for a few factors (mainly unemployed and older adults). Because need still became a more important factor in determining treatment status, while controlling for insurance status, it is likely that the law's expansion of essential benefits, parity, and ban of cost sharing for preventative services improved rates of treatment for those who have more severe mental illness. However, this model did not look at the impact of stigma, knowledge of mental health treatment, or other potential influential factors.

Alternative treatment status only significantly changed following the ACA in relation to income levels. Prior to the ACA, alternative treatment was significantly more likely to be received by employed individuals and individuals with self-reported "very good or excellent" health. It is unsurprising that the ACA did not influence alternative treatment rates because the law aimed to provide access to traditional services through insurance coverage.

It is also surprising that older individuals were greatly impacted by the law. Researchers expected large gains for the sickest, poorest, and unemployed. While those are evident, the statistical and practical significance of the increase in likelihood of treatment following the ACA in relationship to being over 65 and a Medicare beneficiary is particularly interesting. Public insurance, including Medicare and Medicaid are not subject to the same conditions under the ACA, including the same "essential benefits" and ban on cost sharing for preventative services (Golden & Vail, 2014). The elderly are disproportionately likely to have mental illness (like young adults) and so are the disabled: the two main beneficiaries of Medicare (Golden & Vail, 2014). Because they are starting from a disproportionately greater likelihood of needing treatment and coverage for mental health under Medicare was traditionally less comprehensive

than under private insurance or Medicaid, the result may be caused by starting from a lower point. Another possible explanation is that Congress passed the Medicare Improvements for Patients and Providers Act (MIPPA) to expand outpatient coverage for mental health treatment under Medicare (Golden & Vail, 2014). The law phased out discriminatory co-pays for outpatient mental health treatment over 5 years (Golden & Vail, 2014). Therefore, only as of January 2014, (the same time as the implementation of the ACA), outpatient mental health cost sharing reached full parity to other outpatient services (Medicare covers 80% of the cost) (Golden & Vail, 2014). The timing of this law could confound the effect of the ACA.

Further, the lower impact of the ACA on increasing treatment among people with other types of insurance or within specific demographic categories may be smaller than anticipated because of implementation setbacks and changes. Ultimately, all of the results must be viewed in context. The law mandated insurance with minimum coverage, which included behavioral health services. However, the court's dismissal of mandatory Medicaid expansion, technical problems with the online exchanges, and the withdrawal of many insurance companies from the exchanges, disproportionately impacted individuals with severe mental illness.

Because only 32 states expanded Medicaid following the Supreme Court's decision in *National Federation of Independent Business v. Sebelius* (2012), the impact of the policy on poor individuals was not fully realized ("Mental Health Benefits," 2015; Antonisse et al., 2017). Following the crash of the exchanges in October 2013, the 2014 rollout of insurance exchanges still faced some technical problems (Hu, 2013). Further, policy makers underestimated the number of poor and sick individuals and overestimated the number of young, healthy adults who would buy through the exchanges, creating high risk and high premiums. While these problems do exist, they limit the ability to make assessments of the actual policy tools implemented by the

ACA. The results do indicate, that despite flaws and setbacks in the implementation of the ACA, the law made small, but statistically significant impacts on receiving treatment for mental illness based on need.

B. Relationship to Health Economic Theories

There are two specific challenges that particularly affect health insurance: moral hazard and adverse selection (Levin et al., 2004). Moral hazard describes the increased cost to insurers as a result of increased patient demand because insurance reduces the price of care for patients (Levin et al., 2004). This causes a welfare loss because the cost of services delivered is higher than the value to the patient. Adverse selection refers to individuals' tendencies to buy insurance plans based on their knowledge of their likelihood of using services (Levin et al., 2004). If insurance companies avoid costly enrollees or costly enrollees are the only individuals who select certain plans, the insurance market can fail completely (Levin et al., 2004).

The ACA suffers from both of these challenges. For example, the exchanges attracted a sicker population than insurers and lawmakers expected, so premiums were too low to cover claims costs (Kodjak, 2016). In addition, one of the ACA's goals is to encourage managed care to increase efficiency and coordination of care while reducing costs. This was one tool created to offset increased utilization of care due to moral hazard. There are two main approaches for modeling managed care: rationing or rationing with resource shifting (Levin et al., 2004). Both of these models demonstrate the expected benefit of managed care: reducing moral hazard by inducing suppliers to provide care efficiently rather than at the level of patient demand (Levin et al., 2004).

The models and theories described provide potential, partial explanations for the ACA's shortcomings. While these theories are not a complete explanation, adverse selection, moral

hazard, and a better understanding of patient responses to managed care could help inform potential future policy improvement.

C. Limitations

One of the biggest limitations of this model was the use of the public-use file because it lacks geographic indicators that are meaningful in this context. Particularly, the addition of state indicators would greatly enhance the accuracy of the model because 18 states did not expand Medicaid (“Mental Health Benefits,” 2015). Therefore, the results likely understate the impact of the ACA, especially on the poorest individuals. Further, because the dataset is cross-sectional, one cannot look at a specific individual’s change over time, but rather only the population as a whole. This did not limit this study, but hinders some options for further study.

Another limitation is the endogeneity in the model. While control variables were included to attempt to control for omitted variables, given the nature of humans and their health, endogeneity and omission is nearly impossible to eliminate. Because of endogeneity, this model can only look at correlation and cannot prove anything related to causation.

Further, there are a few limitations of the actual survey methods. All of the variables rely on self-response and the issues of interest can be particularly sensitive. While this is really the only way to obtain data on an individual’s feelings or beliefs, it introduces potential error, especially in the more concrete variables such as treatment, employment, income, etc. Of particular note is the number of individuals who failed to respond to questions about their alcohol or drug use, which likely means that the effect of comorbidity is under-reported in the results. The NSDUH survey also fails to include institutionalized individuals including those in jail and in the hospital. Institutionalized individuals are at greater risk for mental illness and, depending on their institution, their ability to receive treatment may not be self-determined.

There is a significant amount of literature on prisoners and mental health, but it is important to note that these individuals are not considered in the model.

Further, this research only included two years of ACA implementation. While the future of the ACA remains in flux, the law still currently stands. As the impacts of the ACA continue to take effect, it will be important to continue to follow the effects.

The results for the f-tests for equality do not tell us what causes the difference or even what is different, but rather simply that the impact of the ACA was not the same across groups. For those categories, just as need by level, in which the interaction terms between mild, moderate, and severe mental illness with “after ACA” are all significant, but the effects are not equal, it cannot be determined the cause of the difference. While the expansion of Medicaid and the rollout problems hinder some of the ability to determine specific causes, more research into the determinants of differences and similarities between the effects on varied races, ages, incomes, education levels, and employment status could give insight into ways to lessen disparities.

D. Areas for Further Study

As mentioned, the lack of state indicators prohibits the ability to look at the effect of Medicaid expansion specifically on access to mental health treatment. This is of particular importance. Further, almost all experts agree that coordination of care for mental health, substance use disorders, and physical health is essential to improving efficacy and reducing costs in all of the separate organizations, but this model does not explore how or if methods to coordinate care impacted treatment levels.

In addition, the location of treatment is not considered in this model. The current best practices advocate for the use of specialty mental illness or substance use disorder treatment

facilities. While these conclusions show the differences in use between traditional and alternative treatment methods, it does not look at specialty facilities versus a primary care physician's office, for example. In addition, it would be helpful to look into the places of treatment, both traditional and alternative, to determine the impact of the ACA on the use of inpatient versus outpatient care for example. In order to reform existing systems, it is important to understand people's access points to care.

Particularly, as insurance exchanges struggle to keep insurance suppliers and premiums rise, it will be important to see whether the ACA's impact will continue. This could explain the most important factors in an individual's decision to seek mental healthcare. Is insurance the most important factor? Has any progress been made on disparities based on race and income? Was this due to the exchanges or Medicaid expansion (if either continue to change over time)?

VI. Conclusion

The ACA attempted to close large gaps in mental health treatment caused by stigma and disparities in the United States. Ultimately, this paper shows that unemployed and elderly individuals tended to gain the most from the implementation of the law. Need became a more important determinate of access to treatment following the ACA, but it must be noted that the impact was practically small for one of the models. Overall, the ACA appears to have a small positive effect on likelihood of receiving treatment given need.

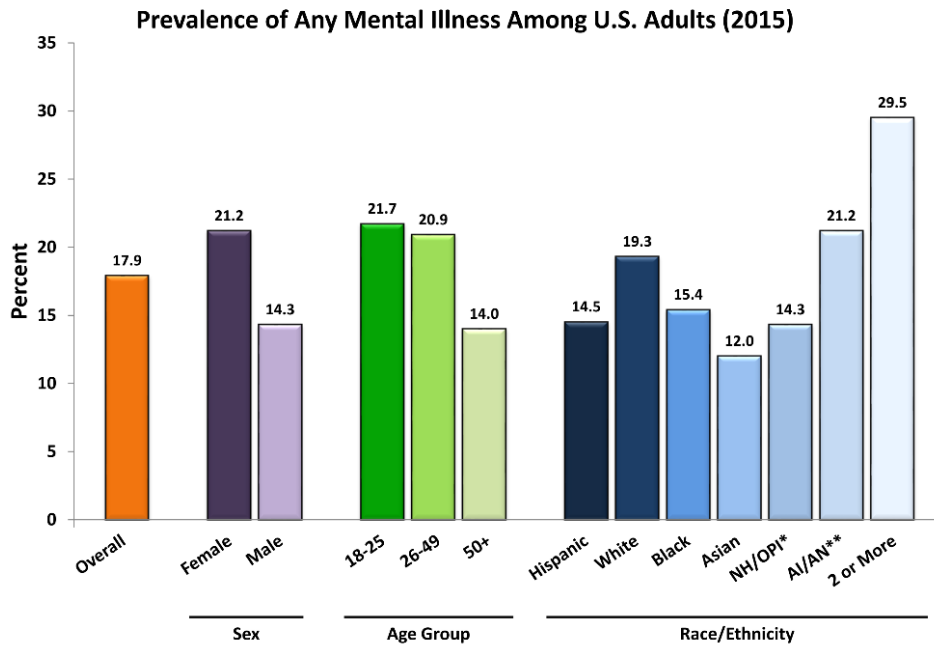
However, this conclusion must be evaluated in light of limitations of the research: including lack of state indicators to account for Medicaid expansion, possible omission bias, self-response error, and an inability to remove endogeneity. It must be noted that this paper only includes two years following the implementation of the ACA, a short period of time considering the scope of the law and significant difficulties with implementation. While small practically, it

shows promise for positive impact on mental health treatment that the ACA made some impact in the first few years. The ACA's impacts may be larger in subsequent years for two reasons: consumer behavior, especially in healthcare, is slow to respond to market changes and stigma should become less relevant over time as more people seek treatment and it is increasingly linked to the primary care system.

This paper provides important lessons for future research evaluating most effective strategies for improving access to mental health treatment. Experts believed the ACA would greatly improve access to treatment, especially for those with serious mental illness. While the ACA did increase levels of treatment, there is room for improvement. As health systems continue to test methods of care coordination and behavioral health advocates implement new strategies aimed at reducing treatment disparities, knowledge of the ACA's impacts will help inform evaluation and data collection. Further study is needed to determine differences in the locations and types of treatment individuals seek as well as reasons for differing impacts by socio-demographic group. The significant increase for elderly Medicare recipients also warrants more exploration. Future study should continue to explore the ACA's impact on disparities in mental health treatment, adjusting methods based on noted limitations.

VII. Figures and Tables

Figure 1



Data courtesy of SAMHSA

*NH/OPI = Native Hawaiian/Other Pacific Islander
 **AI/AN = American Indian/Alaska Native

Table 1

Difference in Means for Observations With Missing Treatment Status				
Variable	Missing	Known	Difference in Means	P-Value
Need	0.028 (0.089)	0.042 (0.121)	-0.014	0.000***
No Mental Illness	0.846 (0.361)	0.800 (0.400)	-0.046	0.000***
Mild Mental Illness	0.088 (0.283)	0.102 (0.303)	-0.014	0.062*
Moderate Mental Illness	0.042 (0.201)	0.053 (0.223)	-0.010	0.051*
Serious Mental Illness	0.024 (0.153)	0.046 (0.209)	-0.022	0.000***
After ACA	0.317 (0.466)	0.242 (0.428)	0.075	0.000***
White (non-Hispanic)	0.465 (0.499)	0.625 (0.484)	-0.160	0.000***
Black (non-Hispanic)	0.164 (0.370)	0.125 (0.330)	0.039	0.000***
Hispanic	0.232 (0.422)	0.161 (0.368)	0.071	0.000***
Other Race	0.139 (0.346)	0.090 (0.286)	0.050	0.000***
Female	0.438 (0.496)	0.535 (0.499)	-0.098	0.000***
Age 18-25	0.574 (0.495)	0.453 (0.498)	0.121	0.000***
Age 26-34	0.128 (0.334)	0.161 (0.368)	-0.033	0.000***
Age 35-49	0.159 (0.366)	0.218 (0.413)	-0.059	0.000***
Age 50-64	0.079 (0.270)	0.103 (0.304)	-0.024	0.001***
Age 65+	0.061 (0.239)	0.065 (0.246)	-0.004	0.496
Employed	0.472 (0.499)	0.596 (0.491)	-0.124	0.000***
Unemployed	0.103 (0.305)	0.072 (0.258)	0.032	0.000***
Other Employment	0.251 (0.434)	0.208 (0.406)	0.043	0.000***
<\$20,000	0.382 (0.486)	0.247 (0.431)	0.135	0.000***
\$20,000-\$49,999	0.333 (0.471)	0.338 (0.473)	-0.005	0.677
\$50,000-\$74,999	0.109 (0.312)	0.160 (0.367)	-0.051	0.000***
>\$75,000	0.176	0.255	-0.079	0.000***

	(0.381)	(0.436)		
Below High School	0.308	0.158	0.149	0.000***
	(0.462)	(0.365)		
High School Graduate	0.565	0.614	-0.049	0.000***
	(0.496)	(0.487)		
College Graduate	0.127	0.227	-0.100	0.000***
	(0.334)	(0.419)		
Married	0.195	0.318	-0.123	0.000***
	(0.396)	(0.466)		
Separated	0.091	0.105	-0.015	0.056*
	(0.287)	(0.307)		
Never Married	0.541	0.452	0.089	0.000***
	(0.498)	(0.498)		
Excellent/Very Good Health	0.498	0.635	-0.137	0.000***
	(0.500)	(0.481)		
Good Health	0.334	0.264	0.070	0.000***
	(0.472)	(0.441)		
Fair/Poor Health	0.167	0.101	0.066	0.000***
	(0.373)	(0.301)		
No Health Insurance	0.270	0.191	0.079	0.000***
	(0.444)	(0.393)		
Medicaid/CHIP	0.206	0.140	0.066	0.000***
	(0.405)	(0.347)		
Medicare	0.115	0.085	0.030	0.000***
	(0.319)	(0.279)		
CHAMPUS/VA/Military	0.030	0.037	-0.008	0.090*
	(0.169)	(0.189)		
Private Insurance	0.444	0.608	-0.164	0.000***
	(0.497)	(0.488)		
Other Insurance	0.046	0.029	0.017	0.002***
	(0.211)	(0.168)		
Alcohol Abuse	0.041	0.048	-0.008	0.138
	(0.197)	(0.215)		
Alcohol Dependence	0.040	0.037	0.002	0.637
	(0.196)	(0.190)		
Drug Abuse	0.012	0.007	0.005	0.065*
	(0.109)	(0.082)		
Drug Dependence	0.032	0.020	0.012	0.011**
	(0.176)	(0.140)		
Alcohol and Drug Abuse	0.003	0.003	-0.001	0.632
	(0.053)	(0.059)		
Alcohol and Drug Dependence	0.024	0.009	0.015	0.000***
	(0.153)	(0.092)		
Alcohol Abuse/Drug Dependence	0.008	0.006	0.002	0.359
	(0.088)	(0.075)		
Alcohol Dependence/Drug Abuse	0.007	0.002	0.005	0.039**
	(0.084)	(0.049)		

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Number: Missing: 1,421
 Known: 349,855

Table 2

Difference in Means for Observations With Missing Alternative Treatment Status				
Variable	Missing	Known	Difference in Means	P-value
Need	0.176 (0.253)	0.037 (0.109)	0.139	0.000***
No Mental Illness	0.387 (0.487)	0.817 (0.387)	0.429	0.000***
Mild Mental Illness	0.198 (0.399)	0.098 (0.297)	0.100	0.000***
Moderate Mental Illness	0.174 (0.379)	0.048 (0.213)	0.126	0.000***
Serious Mental Illness	0.241 (0.428)	0.038 (0.190)	0.203	0.000***
After ACA	0.275 (0.447)	0.241 (0.428)	0.034	0.000***
White (non-Hispanic)	0.722 (0.448)	0.620 (0.485)	0.102	0.000***
Black (non-Hispanic)	0.086 (0.280)	0.126 (0.332)	-0.040	0.000***
Hispanic	0.111 (0.314)	0.163 (0.370)	-0.052	0.000***
Other Race	0.081 (0.272)	0.090 (0.287)	-0.010	0.000***
Female	0.694 (0.461)	0.529 (0.499)	0.165	0.000***
Age 18-25	0.373 (0.484)	0.456 (0.498)	-0.083	0.000***
Age 26-34	0.182 (0.386)	0.160 (0.367)	0.021	0.000***
Age 35-49	0.293 (0.455)	0.215 (0.411)	0.078	0.000***
Age 50-64	0.117 (0.321)	0.102 (0.303)	0.015	0.000***
Age 65+	0.035 (0.185)	0.066 (0.248)	-0.031	0.000***
Employed	0.534 (0.499)	0.598 (0.490)	-0.064	0.000***
Unemployed	0.067 (0.250)	0.072 (0.259)	-0.005	0.018**
Other Employment	0.258 (0.438)	0.206 (0.405)	0.052	0.000***
<\$20,000	0.276 (0.447)	0.246 (0.431)	0.029	0.000***
\$20,000-\$49,999	0.305 (0.461)	0.339 (0.474)	-0.034	0.000***
\$50,000-\$74,999	0.152 (0.359)	0.160 (0.367)	-0.008	0.008***
>\$75,000	0.267	0.254	0.013	0.001***

	(0.442)	(0.435)		
Below High School	0.134	0.160	-0.026	0.000***
	(0.341)	(0.367)		
High School Graduate	0.570	0.616	-0.046	0.000***
	(0.495)	(0.486)		
College Graduate	0.296	0.224	0.072	0.000***
	(0.456)	(0.417)		
Married	0.296	0.319	-0.023	0.000***
	(0.457)	(0.466)		
Separated	0.156	0.103	0.053	0.000***
	(0.363)	(0.304)		
Never Married	0.407	0.455	-0.047	0.000***
	(0.491)	(0.498)		
Excellent/Very Good Health	0.510	0.639	-0.129	0.000***
	(0.500)	(0.480)		
Good Health	0.300	0.263	0.037	0.000***
	(0.458)	(0.440)		
Fair/Poor Health	0.190	0.098	0.092	0.000***
	(0.392)	(0.297)		
No Health Insurance	0.133	0.194	-0.061	0.000***
	(0.340)	(0.395)		
Medicaid/CHIP	0.202	0.138	0.064	0.000***
	(0.401)	(0.345)		
Medicare	0.104	0.084	0.020	0.000***
	(0.305)	(0.278)		
CHAMPUS/VA/Military	0.047	0.037	0.010	0.000***
	(0.211)	(0.188)		
Private Insurance	0.601	0.608	-0.008	0.077*
	(0.490)	(0.488)		
Other Insurance	0.027	0.029	-0.002	0.124
	(0.163)	(0.169)		
Alcohol Abuse	0.050	0.048	0.002	0.350
	(0.218)	(0.214)		
Alcohol Dependence	0.067	0.036	0.031	0.000***
	(0.251)	(0.187)		
Drug Abuse	0.010	0.007	0.004	0.000***
	(0.102)	(0.081)		
Drug Dependence	0.045	0.019	0.026	0.000***
	(0.206)	(0.136)		
Alcohol and Drug Abuse	0.003	0.003	0.000	0.743
	(0.058)	(0.059)		
Alcohol and Drug Dependence	0.026	0.008	0.018	0.000***
	(0.159)	(0.088)		
Alcohol Abuse/Drug Dependence	0.012	0.005	0.006	0.000***
	(0.108)	(0.073)		
Alcohol Dependence/Drug Abuse	0.005	0.002	0.002	0.000***
	(0.069)	(0.049)		

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Number: Missing: 13, 815
 Known: 337,461

Table 3

Comparison of Means of Treatment Status

Variable	Number of Obs.	Percent	Treatment	No Treatment	Difference in Means	P-value
No Mental Illness	279748	79.64%	0.075 (0.264)	0.925 (0.264)	0.850	0.000***
Mild Mental Illness	35693	10.16%	0.279 (0.449)	0.721 (0.449)	0.442	0.000***
Moderate Mental Illness	18429	5.25%	0.426 (0.495)	0.574 (0.495)	0.147	0.000***
Serious Mental Illness	15985	4.55%	0.618 (0.486)	0.382 (0.486)	-0.237	0.000***
Before ACA	265074	75.46%	0.136 (0.343)	0.864 (0.343)	0.727	0.000***
After ACA	84781	24.14%	0.148 (0.355)	0.852 (0.355)	0.703	0.000***
White (non-Hispanic)	218567	62.22%	0.171 (0.376)	0.829 (0.376)	0.658	0.000***
Black (non-Hispanic)	43569	12.40%	0.082 (0.275)	0.918 (0.275)	0.835	0.000***
Hispanic	56320	16.03%	0.078 (0.269)	0.922 (0.269)	0.843	0.000***
Other Race	31399	8.94%	0.107 (0.309)	0.893 (0.309)	0.786	0.000***
Female	187321	53.33%	0.177 (0.382)	0.823 (0.382)	0.645	0.000***
Age 18-25	158349	45.08%	0.120 (0.324)	0.880 (0.324)	0.761	0.000***
Age 26-34	56424	16.06%	0.146 (0.353)	0.854 (0.353)	0.707	0.000***
Age 35-49	76390	21.75%	0.170 (0.375)	0.830 (0.375)	0.661	0.000***
Age 50-64	36007	10.25%	0.172 (0.377)	0.828 (0.377)	0.656	0.000***
Age 65+	22685	6.46%	0.105 (0.306)	0.895 (0.306)	0.790	0.000***
Employed	208602	59.38%	0.121 (0.327)	0.879 (0.327)	0.757	0.000***
Unemployed	25162	7.16%	0.140 (0.347)	0.860 (0.347)	0.720	0.742
Other Employment	72776	20.72%	0.186 (0.389)	0.814 (0.389)	0.627	0.000***
<\$20,000	86410	24.60%	0.155 (0.362)	0.845 (0.362)	0.690	0.000***
\$20,000-\$49,999	118281	33.67%	0.129 (0.335)	0.871 (0.335)	0.743	0.000***
\$50,000-\$74,999	55962	15.93%	0.134 (0.341)	0.866 (0.341)	0.731	0.001***
>\$75,000	89202	25.39%	0.141	0.859	0.717	0.079

			(0.348)	(0.348)		
Below High School	55417	15.78%	0.123	0.877	0.754	0.000***
			(0.328)	(0.328)		
High School Graduate	214926	61.18%	0.136	0.864	0.727	0.000***
			(0.343)	(0.343)		
College Graduate	79512	22.64%	0.158	0.842	0.683	0.000***
			(0.365)	(0.365)		
Married	111375	31.71%	0.133	0.867	0.734	0.000***
			(0.340)	(0.340)		
Separated	36880	10.50%	0.205	0.795	0.590	0.000***
			(0.404)	(0.404)		
Never Married	158285	45.06%	0.126	0.874	0.747	0.000***
			(0.332)	(0.332)		
Excellent/Very Good Health	222130	63.24%	0.112	0.888	0.776	0.000***
			(0.316)	(0.316)		
Good Health	92285	26.27%	0.160	0.840	0.680	0.000***
			(0.366)	(0.366)		
Fair/Poor Health	35375	10.07%	0.256	0.744	0.488	0.000***
			(0.436)	(0.436)		
No Health Insurance	66924	19.05%	0.094	0.906	0.813	0.000***
			(0.291)	(0.291)		
Medicaid/CHIP	49006	13.95%	0.202	0.798	0.596	0.000***
			(0.402)	(0.402)		
Medicare	29732	8.46%	0.186	0.814	0.628	0.000***
			(0.389)	(0.389)		
CHAMPUS/VA/Military	13012	3.70%	0.186	0.814	0.627	0.000***
			(0.389)	(0.389)		
Private Insurance	212871	60.60%	0.137	0.863	0.726	0.004***
			(0.344)	(0.344)		
Other Insurance	10203	2.90%	0.123	0.877	0.754	0.000***
			(0.328)	(0.328)		
Alcohol Abuse	16769	4.82%	0.148	0.852	0.704	0.002***
			(0.355)	(0.355)		
Alcohol Dependence	12958	3.73%	0.237	0.763	0.527	0.000***
			(0.425)	(0.425)		
Drug Abuse	2332	0.67%	0.215	0.785	0.569	0.000***
			(0.411)	(0.411)		
Drug Dependence	6850	1.98%	0.286	0.714	0.427	0.000***
			(0.452)	(0.452)		
Alcohol and Drug Abuse	1221	0.35%	0.156	0.844	0.689	0.116
			(0.363)	(0.363)		
Alcohol and Drug Dependence	2984	0.85%	0.346	0.654	0.308	0.000***
			(0.476)	(0.476)		
Alcohol Abuse/Drug Dependence	1961	0.56%	0.255	0.745	0.489	0.000***
			(0.436)	(0.436)		
Alcohol Dependence/Drug Abuse	854	0.24%	0.268	0.732	0.464	0.000***
			(0.443)	(0.443)		
Standard Deviations in Parentheses			P values: refer to difference in mean of treatment compared			
*** p<0.01, ** p<0.05, * p<0.1			to overall sample mean of treatment (0.139)			

Table 4

Comparison of Means for Need and Treatment Variables Before and After ACA				
Variable	Before ACA	After ACA	Difference in Means	P-Value
Need	0.045 (0.128)	0.041 (0.119)	0.004	0.000***
No Mental Illness	0.801 (0.399)	0.797 (0.403)	0.004	0.007***
Mild Mental Illness	0.101 (0.302)	0.102 (0.303)	-0.001	0.444
Moderate Mental Illness	0.053 (0.224)	0.052 (0.223)	0.001	0.381
Serious Mental Illness	0.049 (0.216)	0.045 (0.206)	0.004	0.000***
Treatment	0.148 (0.355)	0.136 (0.343)	0.012	0.000***
Alternative Treatment	0.058 (0.234)	0.057 (0.232)	0.001	0.265
Standard Deviations in Parentheses		***p<0.01, **p<0.01, *p<0.01		

Table 5

Regression Results and Elasticities For Need Variables				
Independent Variable	(1) Treatment	Semi-/Elasticity Before ACA	Semi-/Elasticity After ACA	Difference in Elasticities
Need	2.065***	0.582	0.609	0.027
	-0.016			
Need^2	-1.737***			
	-0.023			
Need x After ACA	0.097***			
	-0.032			
Need Squared x After ACA	-0.081*			
	-0.044			
Mild Mental Illness	0.177***	127.032	142.824	15.792
	-0.002			
Moderate Mental Illness	0.311***	223.016	241.067	18.052
	-0.003			
Serious Mental Illness	0.489***	351.108	369.455	18.347
	-0.003			
Mild MIxAfter ACA	0.022***			
	-0.004			
Moderate MIxAfter ACA	0.025***			
	-0.006			
Serious MI x After ACA	0.026***			
	-0.006			
Observations	342,741			

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6

Regression Results and Elasticities For Control Variables				
Independent Variable	(1) Treatment	Semi-Elasticity Before ACA	Semi-Elasticity After ACA	Difference in Elasticities
After the ACA	-0.029** (0.012)			
White (Non-Hispanic)	0.063*** (0.002)	45.168	53.243	8.075
Black (Non-Hispanic)	-0.015*** (0.003)	-10.879	-6.260	4.619
Hispanic	-0.004* (0.003)	-3.103	1.679	4.781
Age 18-25	0.144*** (0.005)	103.339	90.332	-13.007
Age 26-34	0.153*** (0.005)	109.786	96.497	-13.289
Age 35-49	0.168*** (0.005)	120.962	109.169	-11.793
Age 50-64	0.163*** (0.005)	116.771	103.073	-13.698
Married	-0.006*** (0.002)	-4.484	5.823	10.307
Separated	0.019*** (0.002)	13.748	26.140	12.392
Female	0.050*** (0.001)	36.068	37.494	1.427
No Health Insurance	-0.030*** (0.003)	-21.296	-18.535	2.761
Medicaid/CHIP	0.034*** (0.003)	24.284	25.674	1.390
Medicare	0.101*** (0.004)	72.341	83.821	11.480
CHAMPUS/VA/Military	0.030*** (0.004)	21.529	30.474	8.946
Private Health Insurance	0.001 (0.003)	0.579	8.093	7.514
<\$20,000	-0.011*** (0.002)	-7.762	-0.293	7.469
\$20,000-\$49,999	-0.013*** (0.002)	-9.663	-4.905	4.758
\$50,000-\$74,999	-0.007*** (0.002)	-5.153	-4.162	0.991
Below High School	-0.033*** (0.002)	-23.990	-29.525	-5.535

High School Graduate	-0.025*** (0.002)	-18.138	-18.551	-0.413
Military	0.007** (0.003)	4.924	5.569	0.645
Excellent/Very Good Health	-0.055*** (0.002)	-39.743	-39.294	0.448
Good Health	-0.030*** (0.002)	-21.366	-19.544	1.823
Employed	-0.031*** (0.002)	-22.404	-12.337	10.067
Unemployed	-0.016*** (0.003)	-11.593	5.260	16.853
Alcohol Abuse	0.014*** (0.003)	9.830	-4.639	-14.469
Alcohol Dependence	0.039*** (0.003)	27.868	16.812	-11.056
Drug Abuse	0.063*** (0.007)	45.159	28.478	-16.681
Drug Dependence	0.065*** (0.004)	46.765	43.324	-3.441
White x After ACA	0.011*** (0.004)			
Black x After ACA	0.006 (0.005)			
Hispanic x After ACA	0.007 (0.005)			
Age 18-25 x After ACA	-0.018** (0.009)			
Age 26-34 x After ACA	-0.019** (0.009)			
Age 35-49 x After ACA	-0.016* (0.008)			
Age 50-64 x After ACA	-0.019** (0.008)			
No Health Ins x After ACA	0.004 (0.006)			
Medicaid/CHIP x After ACA	0.002 (0.005)			
Medicare x After ACA	0.016** (0.008)			
CHAMPUS x After ACA	0.012* (0.007)			
Private x After ACA	0.010** (0.005)			

<\$20,000 x After ACA	0.010** (0.004)
\$20,000-\$49,999 x After ACA	0.007* (0.003)
\$50,000-\$74,999 x After ACA	0.001 (0.004)
Employed x After ACA	0.014*** (0.003)
Unemployed x After ACA	0.023*** (0.007)
Constant	-0.045*** (0.007)
Observations	342,741
R-squared	0.199

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

*Note: Only variables of interest for f-tests have their after ACA interaction terms displayed, but elasticities are provided for all variables.

Table 7

F-Tests For Categories of Variables After ACA for Model with Levels of MI				
Category (all xAfter ACA)	Treatment		Alternative Treatment	
	Joint Significance	Equal Effect	Joint Significance	Equal Effect
Need (MI)	17.73*** (0.00)	0.15 (0.86)	0.29 (0.84)	0.13 (0.88)
Race	3.01** (0.03)	1.92 (0.15)	1.85 (0.14)	2.11 (0.12)
Age	3.64*** (0.01)	2.48* (0.06)	0.8 (0.53)	0.26 (0.85)
Insurance	3.02*** (0.01)	2.14* (0.07)	1.39 (0.22)	1.74 (0.14)
Income	2.2* (0.09)	1.64 (0.19)	6*** (0.00)	0.27 (0.77)
Employment	24.4*** (0.00)	0.86 (0.35)	0.35 (0.70)	0.03 (0.85)
After ACA (all variables)	9.85*** (0.00)		2.42*** (0.00)	

P-values in parentheses

*** p<0.01, ** p<0.05, * p<0.1

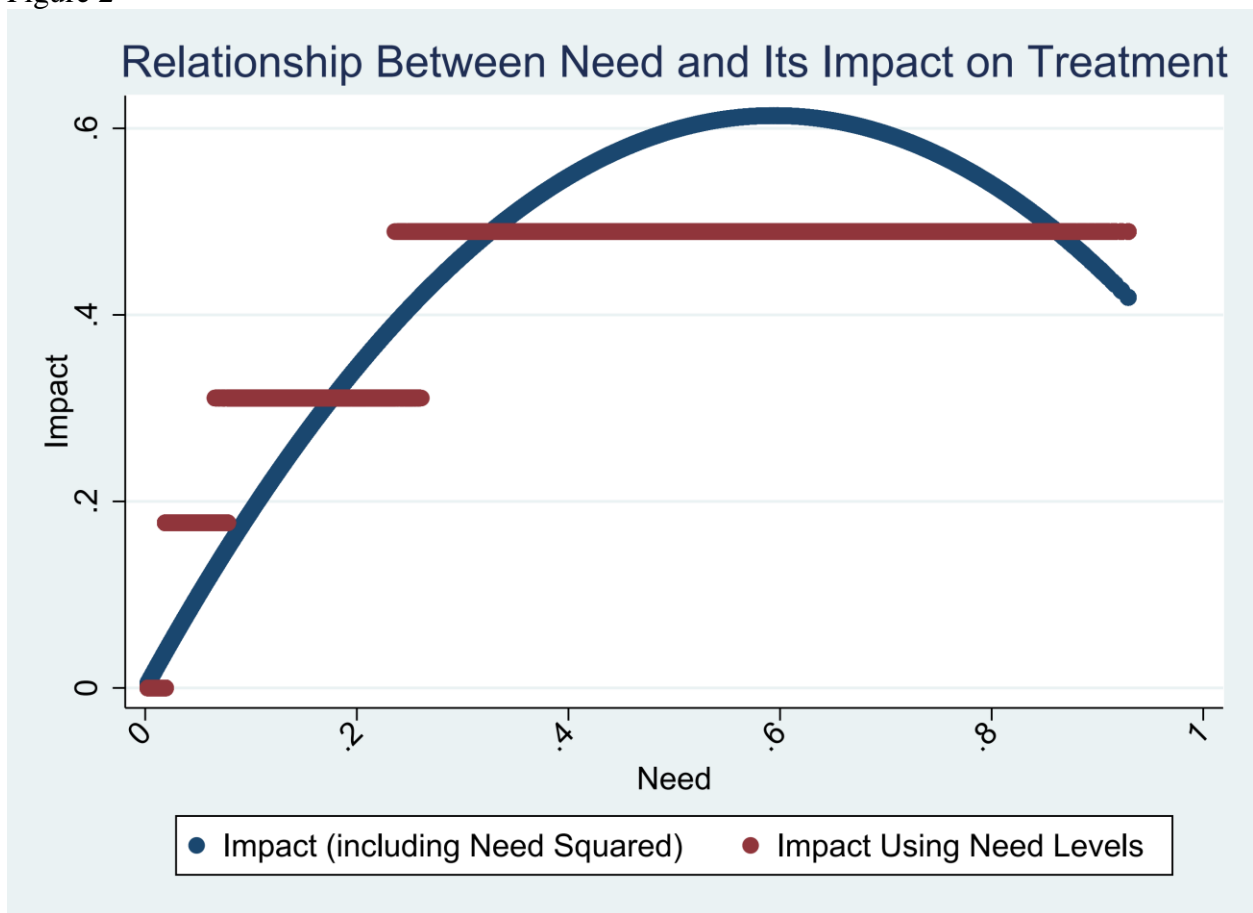
Table 8

F-Tests For Categories of Variables After ACA for Model with Need Squared				
Category (all x After ACA)	Treatment		Alternative Treatment	
	Joint Significance	Equal Effect	Joint Significance	Equal Effect
Need and Need^2	9.87*** (0.00)		0.25 (0.78)	
Race	4.20*** (0.01)	3.12** (0.04)	1.74 (0.16)	1.85 (0.16)
Age	2.76** (0.03)	1.71 (0.16)	0.71 (0.58)	0.21 (0.89)
Insurance	2.97*** (0.01)	2.17* (0.07)	1.37 (0.23)	1.71 (0.14)
Income	3.10** (0.03)	2.1 (0.12)	5.59*** (0.00)	0.2 (0.82)
Employment	25.11*** (0.00)	0.65 (0.42)	0.29 (0.75)	0.06 (0.81)
After ACA (all variables)	8.97*** (0.00)		2.40*** (0.00)	

P-values in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 2



Appendix

Table A1

Independent Variables	Type	NSDUH variable	Imputed?	Categories included in model
Need	Continuous	smipp_u	yes	-
Sex	Dummy	irsex	yes	-
Race	Multiple Dummies	newrace2	yes	Non Hispanic White, Non Hispanic Black, Hispanic, Other (including Native American/Alaska Native, Native Hawaiian/Pacific Islander, Asian, and more than one race)
Age	Multiple Dummies	age2	no	18-25, 26-34, 35-49, 50-64, >65
Income	Multiple Dummies	income	yes	<\$20,000, \$20,000-49,999, \$50,000-\$74,999, >\$75,000
Marital Status	Multiple Dummies	irmarit & irmaritstat	yes	Married, Separated (including divorced and widowed), and Never Married
Education	Multiple Dummies	educat2/eduhighcat	yes	Less than High School, High School Graduate (includes Some College), College graduate
Employment Status	Multiple Dummies	empstat4/irwrkstat18	yes	Employed (includes Full-time and Part-time), Unemployed, Other Employed (includes not in labor force)
Ever been in military	Dummy	service	no	Yes, no (includes don't know)
Self-reported overall health	Multiple Dummies	health	no	Excellent/Very Good, Good, Fair/Poor
Insurance Status	Multiple Dummies	irmcdchp, irmedicr, irchmpus, irprvhl, irothhlt, irinsur4	yes	No Health Insurance, Medicaid/CHIP, Medicare, CHAMPUS (includes Tricare, CHAMPUS, CHAMPVA, the VA or military healthcare), Private insurance, other health insurance

Figure A1

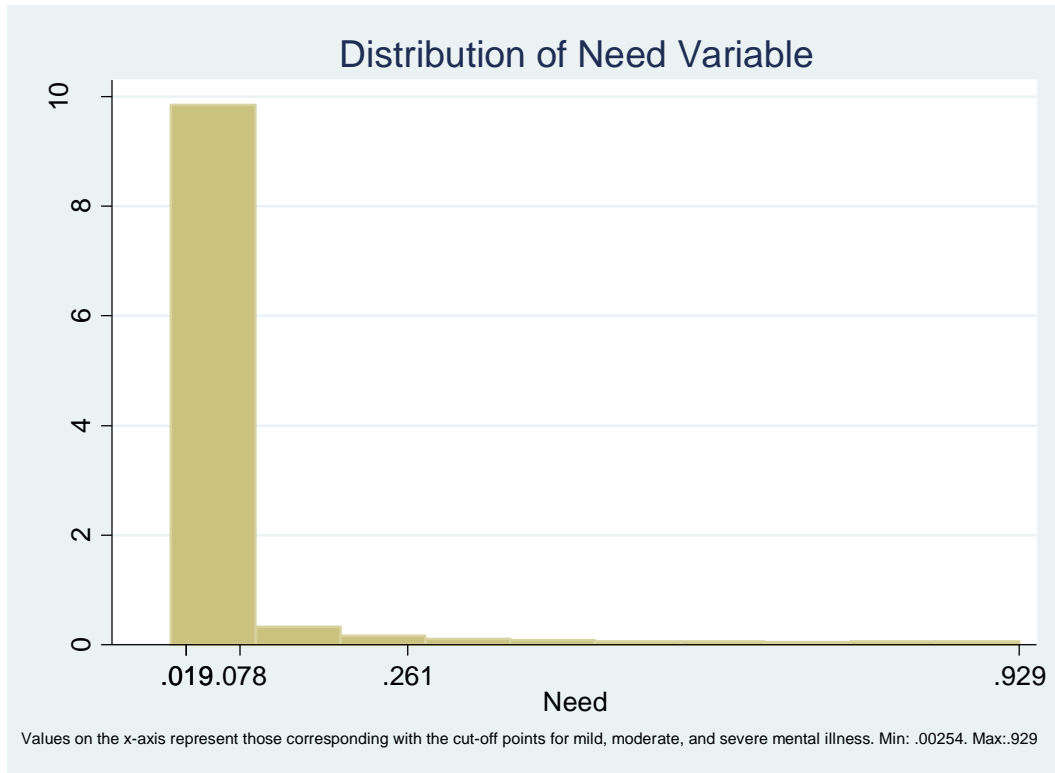


Table A2
Comparison of Means of Treatment Status

Variable	Number of Obs.	Percent	Alternative Treatment	No Alternative Treatment	Difference in Means	P-value
No Mental Illness	275597	81.67%	0.051 (0.220)	0.949 (0.220)	0.898	0.000***
Mild Mental Illness	33079	9.80%	0.089 (0.285)	0.911 (0.285)	0.821	0.000***
Moderate Mental Illness	16091	4.77%	0.085 (0.278)	0.915 (0.278)	0.831	0.000***
Serious Mental Illness	12694	3.76%	0.076 (0.264)	0.924 (0.264)	0.849	0.000***
Before ACA	256033	75.87%	0.057 (0.232)	0.943 (0.232)	0.886	0.582
After ACA	81428	24.13%	0.058 (0.234)	0.942 (0.234)	0.884	0.333
White (non-Hispanic)	209248	62.01%	0.067 (0.251)	0.933 (0.251)	0.865	0.000***
Black (non-Hispanic)	42615	12.63%	0.031 (0.174)	0.969 (0.174)	0.938	0.000***
Hispanic	55114	16.33%	0.041 (0.198)	0.959 (0.198)	0.918	0.000***
Other Race	30484	9.03%	0.054 (0.226)	0.946 (0.226)	0.892	0.017**
Female	178356	52.85%	0.071 (0.256)	0.929 (0.256)	0.858	0.000***
Age 18-25	154011	45.64%	0.053 (0.225)	0.947 (0.225)	0.893	0.000***
Age 26-34	54096	16.03%	0.067 (0.249)	0.933 (0.249)	0.867	0.000***
Age 35-49	72570	21.50%	0.069 (0.253)	0.931 (0.253)	0.862	0.000***
Age 50-64	34502	10.22%	0.053 (0.223)	0.947 (0.223)	0.895	0.000***
Age 65+	22282	6.60%	0.032 (0.176)	0.968 (0.176)	0.936	0.000***
Employed	201889	59.83%	0.065 (0.246)	0.935 (0.246)	0.870	0.000***
Unemployed	24382	7.23%	0.040 (0.195)	0.960 (0.195)	0.921	0.000***
Other Employment	69568	20.62%	0.042 (0.201)	0.958 (0.201)	0.915	0.000***
<\$20,000	83143	24.64%	0.046 (0.209)	0.954 (0.209)	0.908	0.000***
\$20,000-\$49,999	114537	33.94%	0.050 (0.218)	0.950 (0.218)	0.900	0.000***
\$50,000-\$74,999	54020	16.01%	0.066 (0.248)	0.934 (0.248)	0.869	0.000***
>\$75,000	85761	25.41%	0.073	0.927	0.854	0.000***

Below High School	53999	16.00%	(0.260) 0.029 (0.167)	(0.260) 0.971 (0.167)	0.943	0.000***
High School Graduate	207853	61.59%	0.053 (0.224)	0.947 (0.224)	0.894	0.000***
College Graduate	75609	22.41%	0.090 (0.287)	0.910 (0.287)	0.819	0.000***
Married	107560	31.87%	0.065 (0.246)	0.935 (0.246)	0.871	0.000***
Separated	34854	10.33%	0.053 (0.223)	0.947 (0.223)	0.895	0.000***
Never Married	153425	45.46%	0.053 (0.225)	0.947 (0.225)	0.893	0.000***
Excellent/Very Good Health	215788	63.94%	0.064 (0.244)	0.936 (0.244)	0.873	0.000***
Good Health	88617	26.26%	0.049 (0.215)	0.951 (0.215)	0.903	0.000***
Fair/Poor Health	32993	9.78%	0.040 (0.196)	0.960 (0.196)	0.920	0.000***
No Health Insurance	65464	19.40%	0.043 (0.202)	0.957 (0.202)	0.915	0.000***
Medicaid/CHIP	46515	13.78%	0.033 (0.177)	0.967 (0.177)	0.935	0.000***
Medicare	28459	8.43%	0.033 (0.179)	0.967 (0.179)	0.934	0.000***
CHAMPUS/VA/Military	12409	3.68%	0.051 (0.220)	0.949 (0.220)	0.898	0.001***
Private Insurance	205205	60.81%	0.069 (0.253)	0.931 (0.253)	0.863	0.000***
Other Insurance	9894	2.93%	0.053 (0.225)	0.947 (0.225)	0.893	0.088*
Alcohol Abuse	16145	4.83%	0.067 (0.250)	0.933 (0.250)	0.866	0.000***
Alcohol Dependence	12112	3.63%	0.064 (0.245)	0.936 (0.245)	0.872	0.002***
Drug Abuse	2206	0.66%	0.063 (0.243)	0.937 (0.243)	0.874	0.273
Drug Dependence	6302	1.89%	0.049 (0.215)	0.951 (0.215)	0.903	0.001***
Alcohol and Drug Abuse	1179	0.35%	0.068 (0.252)	0.932 (0.252)	0.864	0.151
Alcohol and Drug Dependence	2659	0.79%	0.067 (0.250)	0.933 (0.250)	0.866	0.048**
Alcohol Abuse/Drug Dependence	1809	0.54%	0.062 (0.241)	0.938 (0.241)	0.876	0.419
Alcohol Dependence/Drug Abuse	798	0.24%	0.079 (0.270)	0.921 (0.270)	0.842	0.024**
Standard Deviations in Parentheses *** p<0.01, ** p<0.05, * p<0.1			P values: refer to difference in mean of treatment compared to overall sample mean of treatment (0.139).			

Table A3

Comparison of Means for Control Variables Before and After ACA				
Variable	Before ACA	After ACA	Difference in Means	P-Value
White (non-Hispanic)	0.611 (0.488)	0.628 (0.483)	-0.018	0.000***
Black (non-Hispanic)	0.122 (0.328)	0.125 (0.331)	-0.003	0.016**
Hispanic	0.169 (0.375)	0.159 (0.366)	0.010	0.000***
Other Race	0.098 (0.298)	0.087 (0.282)	0.011	0.000***
Female	0.540 (0.498)	0.534 (0.499)	0.006	0.000***
Age 18-25	0.324 (0.468)	0.494 (0.500)	-0.170	0.000***
Age 26-34	0.205 (0.404)	0.147 (0.354)	0.058	0.000***
Age 35-49	0.263 (0.440)	0.204 (0.403)	0.059	0.000***
Age 50-64	0.123 (0.329)	0.096 (0.295)	0.027	0.000***
Age 65+	0.085 (0.278)	0.058 (0.235)	0.026	0.000***
Employed	0.339 (0.473)	0.678 (0.467)	-0.339	0.000***
Unemployed	0.030 (0.170)	0.086 (0.280)	-0.056	0.000***
Other Employment	0.120 (0.325)	0.236 (0.425)	-0.116	0.000***
<\$20,000	0.222 (0.416)	0.256 (0.436)	-0.033	0.000***
\$20,000-\$49,999	0.320 (0.466)	0.344 (0.475)	-0.024	0.000***
\$50,000-\$74,999	0.159 (0.366)	0.160 (0.366)	0.000	0.805
>\$75,000	0.298 (0.458)	0.241 (0.427)	0.058	0.000***
Below High School	0.140 (0.347)	0.165 (0.371)	-0.025	0.000***
High School Graduate	0.596 (0.491)	0.620 (0.485)	-0.024	0.000***
College Graduate	0.264 (0.441)	0.215 (0.411)	0.049	0.000***
Married	0.209 (0.406)	0.353 (0.478)	-0.144	0.000***
Separated	0.071 (0.258)	0.116 (0.320)	-0.045	0.000***

Never Married	0.209 (0.406)	0.531 (0.499)	-0.322	0.000***
Excellent/Very Good Health	0.610 (0.488)	0.642 (0.479)	-0.032	0.000***
Good Health	0.275 (0.447)	0.261 (0.439)	0.015	0.000***
Fair/Poor Health	0.114 (0.318)	0.097 (0.296)	0.017	0.000***
No Health Insurance	0.136 (0.342)	0.210 (0.407)	-0.074	0.000***
Medicaid/CHIP	0.163 (0.370)	0.133 (0.340)	0.030	0.000***
Medicare	0.108 (0.310)	0.078 (0.268)	0.030	0.000***
CHAMPUS/VA/Military	0.041 (0.199)	0.036 (0.186)	0.005	0.000***
Private Insurance	0.631 (0.483)	0.600 (0.490)	0.030	0.000***
Other Insurance	0.033 (0.180)	0.028 (0.165)	0.005	0.000***
Alcohol Abuse	0.035 (0.185)	0.052 (0.223)	-0.017	0.000***
Alcohol Dependence	0.032 (0.177)	0.039 (0.194)	-0.007	0.000***
Drug Abuse	0.006 (0.077)	0.007 (0.083)	-0.001	0.002***
Drug Dependence	0.019 (0.136)	0.020 (0.141)	-0.002	0.005***
Alcohol and Drug Abuse	0.002 (0.046)	0.004 (0.062)	-0.002	0.000***
Alcohol and Drug Dependence	0.006 (0.079)	0.009 (0.096)	-0.003	0.000***
Alcohol Abuse/Drug Dependence	0.004 (0.065)	0.006 (0.077)	-0.002	0.000***
Alcohol Dependence/Drug Abuse	0.002 (0.039)	0.003 (0.052)	-0.001	0.000***

Standard Deviations in Parentheses

***p<0.01, **p<0.01, *p<0.01

Table A4

Regression and Elasticities Using Levels of Mental Illness for Need				
Independent Variable	(1) Treatment	Semi-Elasticity Before ACA	Semi-Elasticity After ACA	Difference in Elasticities
Mild Mental Illness	0.177*** (0.002)	127.032	142.824	15.792
Moderate Mental Illness	0.311*** (0.003)	223.016	241.067	18.052
Serious Mental Illness	0.489*** (0.003)	351.108	369.455	18.347
After the ACA	-0.029** (0.012)			
White (Non-Hispanic)	0.063*** (0.002)	45.168	53.243	8.075
Black (Non-Hispanic)	-0.015*** (0.003)	-10.879	-6.260	4.619
Hispanic	-0.004* (0.003)	-3.103	1.679	4.781
Age 18-25	0.144*** (0.005)	103.339	90.332	-13.007
Age 26-34	0.153*** (0.005)	109.786	96.497	-13.289
Age 35-49	0.168*** (0.005)	120.962	109.169	-11.793
Age 50-64	0.163*** (0.005)	116.771	103.073	-13.698
Married	-0.006*** (0.002)	-4.484	5.823	10.307
Separated	0.019*** (0.002)	13.748	26.140	12.392
Female	0.050*** (0.001)	36.068	37.494	1.427
No Health Insurance	-0.030*** (0.003)	-21.296	-18.535	2.761
Medicaid/CHIP	0.034*** (0.003)	24.284	25.674	1.390
Medicare	0.101*** (0.004)	72.341	83.821	11.480
CHAMPUS/VA/Military	0.030*** (0.004)	21.529	30.474	8.946
Private Health Insurance	0.001 (0.003)	0.579	8.093	7.514
<\$20,000	-0.011*** (0.002)	-7.762	-0.293	7.469

\$20,000-\$49,999	-0.013*** (0.002)	-9.663	-4.905	4.758
\$50,000-\$74,999	-0.007*** (0.002)	-5.153	-4.162	0.991
Below High School	-0.033*** (0.002)	-23.990	-29.525	-5.535
High School Graduate	-0.025*** (0.002)	-18.138	-18.551	-0.413
Military	0.007** (0.003)	4.924	5.569	0.645
Excellent/Very Good Health	-0.055*** (0.002)	-39.743	-39.294	0.448
Good Health	-0.030*** (0.002)	-21.366	-19.544	1.823
Employed	-0.031*** (0.002)	-22.404	-12.337	10.067
Unemployed	-0.016*** (0.003)	-11.593	5.260	16.853
Alcohol Abuse	0.014*** (0.003)	9.830	-4.639	-14.469
Alcohol Dependence	0.039*** (0.003)	27.868	16.812	-11.056
Drug Abuse	0.063*** (0.007)	45.159	28.478	-16.681
Drug Dependence	0.065*** (0.004)	46.765	43.324	-3.441
Mild MIxAfter ACA	0.022*** (0.004)			
Moderate MIxAfter ACA	0.025*** (0.006)			
Serious MI x After ACA	0.026*** (0.006)			
White x After ACA	0.011*** (0.004)			
Black x After ACA	0.006 (0.005)			
Hispanic x After ACA	0.007 (0.005)			
Age 18-25 x After ACA	-0.018** (0.009)			
Age 26-34 x After ACA	-0.019** (0.009)			
Age 35-49 x After ACA	-0.016* (0.008)			

Age 50-64 x After ACA	-0.019** (0.008)
No Health Ins x After ACA	0.004 (0.006)
Medicaid/CHIP x After ACA	0.002 (0.005)
Medicare x After ACA	0.016** (0.008)
CHAMPUS x After ACA	0.012* (0.007)
Private x After ACA	0.010** (0.005)
<\$20,000 x After ACA	0.010** (0.004)
\$20,000-\$49,999 x After ACA	0.007* (0.003)
\$50,000-\$74,999 x After ACA	0.001 (0.004)
Employed x After ACA	0.014*** (0.003)
Unemployed x After ACA	0.023*** (0.007)
Constant	-0.045*** (0.007)
Observations	342,741
R-squared	0.199

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A5

Regression Including Need Squared and Elasticities				
Independent Variables	(1) Treatment	Semi-/Elasticity Before ACA	Semi-/Elasticity After ACA	Elasticity Difference
Need	2.065*** (0.016)	0.582	2.116	1.534
Need^2	-1.737*** (0.023)			
After the ACA	-0.032*** (0.012)			
White (Non-Hispanic)	0.063*** (0.002)	45.315	54.563	9.248
Black (Non-Hispanic)	-0.017*** (0.003)	-12.372	-7.659	4.713
Hispanic	-0.007*** (0.003)	-4.853	-0.100	4.753
Age 18-25	0.157*** (0.005)	112.375	102.030	-10.345
Age 26-34	0.163*** (0.005)	116.987	105.369	-11.618
Age 35-49	0.175*** (0.005)	125.847	115.351	-10.496
Age 50-64	0.167*** (0.005)	119.619	107.053	-12.567
Married	-0.009*** (0.002)	-6.246	4.235	10.481
Separated	0.020*** (0.002)	14.236	27.895	13.658
Female	0.055*** (0.001)	39.204	40.863	1.659
No Health Insurance	-0.029*** (0.003)	-21.091	-18.447	2.644
Medicaid/CHIP	0.036*** (0.003)	25.521	26.574	1.053
Medicare	0.103*** (0.004)	73.896	85.875	11.979
CHAMPUS/VA/Military	0.032*** (0.004)	22.784	30.212	7.429
Private Health Insurance	0.001 (0.003)	0.829	8.273	7.444
<\$20,000	-0.009*** (0.002)	-6.803	1.874	8.677
\$20,000-\$49,999	-0.013*** (0.002)	-8.997	-3.285	5.712

\$50,000-\$74,999	-0.007*** (0.002)	-4.680	-3.158	1.522
Below High School	-0.035*** (0.002)	-25.341	-31.321	-5.980
High School Graduate	-0.027*** (0.002)	-19.095	-19.676	-0.581
Military	0.006** (0.003)	4.271	5.905	1.634
Excellent/Very Good Health	-0.062*** (0.002)	-44.815	-45.412	-0.596
Good Health	-0.034*** (0.002)	-24.482	-23.227	1.254
Employed	-0.032*** (0.002)	-22.881	-12.571	10.310
Unemployed	-0.016*** (0.003)	-11.623	4.942	16.565
Alcohol Abuse	0.018*** (0.003)	13.268	0.067	-13.201
Alcohol Dependence	0.049*** (0.003)	34.893	26.189	-8.704
Drug Abuse	0.069*** (0.007)	49.537	35.435	-14.102
Drug Dependence	0.075*** (0.004)	53.604	48.775	-4.829
Need x After ACA	0.097*** (0.032)			
Need Squared xAfter ACA	-0.081* (0.044)			
White x After ACA	0.013*** (0.004)			
Black x After ACA	0.007 (0.005)			
Hispanic x After ACA	0.007 (0.005)			
Age 18-25 x After ACA	-0.014 (0.009)			
Age 26-34 x After ACA	-0.016* (0.009)			
Age 35-49 x After ACA	-0.015* (0.009)			
Age 50-64 x After ACA	-0.018** (0.009)			
No Health Ins x After ACA	0.004 (0.006)			

Medicaid/CHIP x After ACA	0.001 (0.005)
Medicare x After ACA	0.017** (0.008)
CHAMPUS x After ACA	0.010 (0.007)
Private x After ACA	0.010** (0.005)
<\$20,000 x After ACA	0.012*** (0.004)
\$20,000-\$49,999 x After ACA	0.008** (0.003)
\$50,000-\$74,999 x After ACA	0.002 (0.004)
Employed x After ACA	0.014*** (0.003)
Unemployed x After ACA	0.023*** (0.007)
Constant	-0.052*** (0.007)
Observations	342,741
R-squared	0.187

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A6

Regressions with Alternative Treatment as the Dependent Variable		
Independent Variable	(1) Need Levels	(2) Need Squared
Mild Mental Illness	0.0365*** (0.00158)	
Moderate Mental Illness	0.0328*** (0.00223)	
Serious Mental Illness	0.0240*** (0.00257)	
Need		0.25*** (0.01)
Need^2		-0.31*** (0.02)
After the ACA	0.0174** (0.00812)	0.02** (0.01)
White (Non-Hispanic)	0.0116*** (0.00167)	0.01*** (0.00)
Black (Non-Hispanic)	-0.0158*** (0.00204)	-0.02*** (0.00)
Hispanic	-0.00417** (0.00196)	-0.00** (0.00)
Age 18-25	0.0232*** (0.00374)	0.03*** (0.00)
Age 26-34	0.0282*** (0.00376)	0.03*** (0.00)
Age 35-49	0.0284*** (0.00362)	0.03*** (0.00)
Age 50-64	0.0143*** (0.00361)	0.02*** (0.00)
Married	0.000850 (0.00116)	0.00 (0.00)
Separated	-0.00118 (0.00162)	-0.00 (0.00)
Female	0.0288*** (0.000850)	0.03*** (0.00)
No Health Insurance	-0.00457** (0.00216)	-0.00** (0.00)
Medicaid/CHIP	-0.0157*** (0.00214)	-0.02*** (0.00)
Medicare	6.26e-05 (0.00322)	0.00 (0.00)
CHAMPUS/VA/Military	0.000135 (0.00284)	0.00 (0.00)

Private Health Insurance	0.00647***	0.01***
	(0.00194)	(0.00)
<\$20,000	0.000313	0.00
	(0.00151)	(0.00)
\$20,000-\$49,999	-0.00246*	-0.00*
	(0.00132)	(0.00)
\$50,000-\$74,999	0.00253*	0.00*
	(0.00150)	(0.00)
Below High School	-0.0382***	-0.04***
	(0.00148)	(0.00)
High School Graduate	-0.0270***	-0.03***
	(0.00106)	(0.00)
Military	-0.00187	-0.00
	(0.00192)	(0.00)
Excellent/Very Good Health	0.00927***	0.01***
	(0.00150)	(0.00)
Good Health	0.00173	0.00
	(0.00155)	(0.00)
Employed	0.0109***	0.01***
	(0.00124)	(0.00)
Unemployed	0.00247	0.00
	(0.00194)	(0.00)
Alcohol Abuse	0.00764***	0.01***
	(0.00188)	(0.00)
Alcohol Dependence	0.00376*	0.01***
	(0.00216)	(0.00)
Drug Abuse	0.0170***	0.02***
	(0.00493)	(0.00)
Drug Dependence	-0.00384	-0.00
	(0.00296)	(0.00)
Mild MIxAfter ACA	0.000890	
	(0.00319)	
Moderate MIxAfter ACA	0.00297	
	(0.00447)	
Serious MI x After ACA	0.00328	
	(0.00498)	
Need x After ACA		-0.00
		(0.03)
Need Squared xAfter ACA		0.01
		(0.04)
White x After ACA	0.00225	0.00
	(0.00327)	(0.00)
Black x After ACA	0.00501	0.00
	(0.00404)	(0.00)

Hispanic x After ACA	0.00762**	0.01**
	(0.00382)	(0.00)
Age 18-25 x After ACA	-0.0108	-0.01
	(0.00659)	(0.01)
Age 26-34 x After ACA	-0.0115*	-0.01*
	(0.00669)	(0.01)
Age 35-49 x After ACA	-0.00930	-0.01
	(0.00650)	(0.01)
Age 50-64 x After ACA	-0.00923	-0.01
	(0.00650)	(0.01)
No Health Ins x After ACA	-0.00367	-0.00
	(0.00433)	(0.00)
Medicaid/CHIP x After ACA	0.000288	0.00
	(0.00400)	(0.00)
Medicare x After ACA	-0.00809	-0.01
	(0.00583)	(0.01)
CHAMPUS x After ACA	0.00668	0.01
	(0.00525)	(0.01)
Private x After ACA	0.00167	0.00
	(0.00365)	(0.00)
<\$20,000 x After ACA	-0.0109***	-0.01***
	(0.00303)	(0.00)
\$20,000-\$49,999 x After ACA	-0.00943***	-0.01***
	(0.00257)	(0.00)
\$50,000-\$74,999 x After ACA	-0.00858***	-0.01***
	(0.00294)	(0.00)
Employed x After ACA	-0.00169	-0.00
	(0.00224)	(0.00)
Unemployed x After ACA	-0.00266	-0.00
	(0.00528)	(0.01)
Constant	0.0162***	0.02***
	(0.00492)	(0.00)
Observations	330,926	330,926
R-squared	0.020	0.018

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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