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William Chad Kramer

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THE AFFORDABLE CARE ACT DEPENDENT CARE EXPANSION: MENTAL HEALTH
TREATMENT UTILIZATION AND OUTCOMES FOR YOUNG ADULTS

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment of
the Requirements for the Degree
Master of Arts
Economics

by
William Chad Kramer
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Accepted by:
Dr. Scott Barkowski, Committee Chair
Dr. Devon Gorry
Dr. Scott Templeton

ABSTRACT

Since its inception in March of 2010 there have been many studies regarding the effectiveness of the Patient Protection and Affordable Care Act. One area of public health that has received limited attention in tandem with the ACA is mental health. To test the impact of the Affordable Care Act on mental health utilization rates and overall access among young adults, I used a difference-in-differences model focusing on the Dependent Care Expansion policy within the ACA. As mental health can be difficult to quantify, I used several measures from the National Survey on Drug Use and Health (NSDUH) that identify psychological distress levels, suicidal ideation, receipt of mental health treatment, and major depressive episodes. For my primary analysis, I use survey respondents between the ages of 19 and 25 as the treatment group with a control group of individuals aged 26 to 29. My results show little evidence of an impact of the ACA Dependent Care Expansion on mental health utilization among young adults. Women aged 19 to 21 who perceived a need for mental health treatment saw increased use of mental health services following the law change which was significant at the ten percent level. The treatment of major depressive episodes via prescription medication also saw a positive and significant effect at the ten percent level. This held for both men and women when compared to a control group of 26 to 34 but not with a control group of 26 to 29. The results of this paper suggest the ACA has had limited meaningful effect on areas of mental health treatment among young adults due to the associated increased insurance having little to no effect on treatment and thus little to no effect on actual health outcomes. Given this outcome, law makers may wish to consider more focused or smaller scale policies in an effort to produce significant change. However, further research is required to draw a more thorough conclusion.

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INTRODUCTION

Mental health represents one of the most significant challenges facing the American Healthcare system today. Part of the reason for this is a lack of public awareness on the issue coupled with limited research and the inherent complexity of mental health conditions. Compared to their older counterparts, young adults tend to have high mental health care needs.¹ This claim is backed by research regarding the adult-dependent mandate (ADM) provision of the Affordable Care Act (ACA), which found that those within the ADM cohort were more likely than older adults to incur claims related to mental health, substance abuse, and pregnancy.² This does not necessitate that mental illness is more prevalent among young adults, but there is clearly a strong driver behind their increased use of services.

One explanation may be the transition from adolescence to adulthood which often involves many life changes that can trigger mental distress, making services related to mental illness an important component of young adult medical care.^{3,4} Another explanation could be that adolescence and early adulthood is frequently where mental illness begins to emerge,⁵ resulting in mental disorder being the most frequent reason why young adults seek hospital-based care, aside from visits related to childbirth.⁶ It would appear that young adults are on average more affected by mental health conditions. Therefore, it would not be unusual for them to show more drastic changes in outcomes. This point coupled with the fact young adults are directly targeted by the ACA dependent care provision makes them the ideal group for evaluating the policy's relative effectiveness.

The Patient Protection and Affordable Care Act (ACA) was intended to address healthcare concerns on a national scale by targeting rising costs and the lack of medical insurance coverage across America. Its three primary goals were to make affordable health insurance more available via premium tax credits, to expand Medicaid to cover all adults with income below 138% of the federal poverty level, and to support medical care delivery methods designed to lower costs.⁷ This paper focuses on another feature of the ACA, the dependent care expansion provision, which specifies that young adults could remain on their parents' health insurance plans until age 26. This is an increase over most previous cutoff ages, typically 19, 21, 23, or 25, depending on the state.

Early estimates suggest the provision increased the number of insured people ages 18-25 by over two million^{8,9,10} and increased the use of emergency department and hospital services.^{6,11} These increases are particularly important for young adults given that mental health and substance use disorders often peak in young adulthood¹² and insurance coverage has historically been low for this group.¹³ The extension eased the burden on parents and their children concerned about losing health coverage after graduation from college. More importantly, it reduced the costs of pursuing medical treatment for young adults who could remain on the often better and more cost-effective plans of their parents. The reduction in costs would presumably lead to the pursuit of more mental health treatment and treatment in general which would prompt better outcomes. However, whether this is a statistically significant reality or even due to the result of the ACA policy and not due to other existing factors is unclear.

My research focuses on estimating the effect of the ACA dependent care expansion on mental health treatment utilization rates and self-reported mental health in young adults. I use data for the years 2006 through 2013 gathered by the National Survey on Drug Use and Health (NSDUH); an annual, cross-sectional survey of over 55,000 noninstitutionalized people across the United States. The survey covers the use and abuse of drugs and alcohol, mental health problems, and experiences with mental health or substance abuse treatment. Survey subjects are selected through a stratified random sample of addresses and answer questions using audio, computer-assisted self-interviewing. These techniques help address concerns of nonresponse and social desirability bias, which is a concern with all surveys that measure stigmatized conditions and behaviors.¹⁴

The analyze this data using a difference-in-differences model. I estimate the effect of dependent care eligibility arising from the implementation of the dependent coverage provision for affected young adults ages 19 to 25. This difference-in-differences approach helps address the possibility of omitted variable bias by comparison of the affected individuals to a control group of slightly older adults. To further address potential omitted variables, I also directly control for measures of population density, county type, and education level to attempt to capture some of the discrepancies across groups that could influence outcomes.

An existing issue with the NSDUH that persists in this paper is that data confidentiality prevents me from including controls for some important factors. Ages are only known to the broad-group level and state of residence is not known for respondents.

Examining detailed geographic differences would likely have been helpful given thirty-seven states had some form of extended dependent coverage provision before 2010.^{15,16} However, most of those provisions were more restrictive than the one in the ACA that superseded them, and there is little evidence that the state provisions increased coverage.^{17,18} Although recent evidence suggests they did have an effect for 19 to 23 year-olds.¹⁹

From my research, I find that the younger half of the young adult cohort, specifically young adults aged 19 to 21 saw more significant impact from the change in health care policy with the most substantial changes in mental health outcomes. Women in particular captured the majority of the improvements, though given they are more often affected by mental illness this should not be surprising.

As a whole mental health appears to be improving with levels of psychological distress and major depressive episodes declining as well as mental health treatment increasing. However, the vast majority of my regression results were not statistically significant, suggesting the ACA had minimal effect on the mental health rates of the young adult population. An exception came with females aged 19 to 21 who had a perceived need for mental health treatment. In this case, individuals received more treatment over time, a result that was significant at the 10 percent level. When compared to a control group that incorporated 30 to 34-year-olds, treatment of major depressive episodes for young adults using prescription medication saw a positive and significant increase following expanded eligibility. This same outcome was not significant for the

same population with a control group of 26 to 29-year-olds only. More research delving into a state-by-state comparison could offer a clearer image.

LITERATURE REVIEW

The trends in mental health characteristics and treatments for young adults eligible for the dependent care expansion is the basis of my research. The dependent care coverage provision of the ACA provided individuals between the ages of 19 and 25 the ability to remain under their parent's existing private employer sponsored health insurance plan. Although 33 states mandated some sort of dependent care coverage for young adults before the ACA extension, typically for students or financially dependent young adults, this age group experienced the highest rates of uninsured individuals, with approximately 30% of this age group not having coverage in 2009.²⁰ Lack of insurance is often correlated with a number of adverse effects including a lower preventative care utilization rate. Few areas suffer from this more than psychological care due to the inherent high cost of clinical help and inconsistencies in treatment outcomes not to mention public stigma surrounding the issue. Findings from the Oregon health insurance experiment suggest there may be pent-up demand for mental health treatment among the uninsured, who frequently do not seek treatment because of cost concerns.^{21,22}

Yaa Akosa Antwi et al (2012) looked at impacts of the ACA provision on mental health and mental health treatment using data from the National Inpatient Sample, a national sample of hospital admissions. They found that the provision had both increased inpatient admissions overall among young adults and increased the fraction of young adults admitted with private insurance. The same study found that mental health

admissions had increased by 5.5 percent, relative to a comparison group of older adults, and that mental health admissions increased more than all non-pregnancy-related admissions (including non- mental health admissions).⁸ In another study, Paul Fronstin used claims data from a single large employer to compare young adults who were covered as employees and those who were newly covered as dependents. He found that people enrolled through the new provision were higher users of mental health and substance abuse treatment than people in the same age group with coverage in their own name.²

An ACA Provision Increased Treatment For Young Adults With Possible Mental Illness Relative To Comparison Group

A study by Saloner et al. looked into the ACA provision's effect on treatment for young adults with possible mental illness.²³ Using data from the 2008-12 National Survey on Drug Use and Health they examined the impact of the ACA dependent coverage provision on people ages 18-25 with possible mental health or substance use disorders. Saloner et al.'s work mirrors my own in its use of the Kessler-6 inventory scoring system for psychological distress, its same source of data in the NSDUH, and through its use of a difference-in-differences regression to estimate the impact of the provision following other studies that have similarly looked at the ACA dependent coverage provision.^{9,10,24} Additionally, Saloner et al. used linear probability models to capture the average impacts of the policy including indicators for age group and for whether the person was observed in the post period, after the implementation of the policy. I follow a similar method but

with an expanded time frame of interest beginning in 2006 and ending in 2013 offering an approximate four year lead up and away from the ACA implementation.

Their results found that after implementation of the ACA provision, among people ages 18-25 with possible mental health disorders, mental health treatment increased by 5.3 percentage points relative to a comparison group of similar people ages 26-35. Smaller but consistent effects were found among all young adults, not only those with possible illness. For people using mental health treatment, uninsured visits declined by 12.4 percentage points, and visits paid by private insurance increased by 12.9 percentage points. No change was observed in mental health treatment setting. Outcomes related to substance abuse treatment did not change during the study period. In general, this suggests that the ACA dependent coverage provision has had a positive effect on mental health treatment.

Access to health insurance and the use of inpatient medical care: Evidence from the Affordable Care Act young adult mandate

Prior to a study by Akosa et al. (2014) which evaluated the implications of the dependent care expansion on inpatient hospitalizations, there was no existing literature on the impact of the ACA young adult mandate on inpatient admissions. Evidence suggested an increase in access to healthcare in general, but not necessarily an increase in a usual source of care. In their study they focused on mental health related inpatient care given the prevalence of mental health needs for young adults providing the first evidence on the impact of the ACA dependent coverage expansion on inpatient care use. Additionally,

their results contributed to the literature on the effect of insurance on use of care among young adults by evaluating the effect of gaining rather than losing health insurance on medical use. The study utilized the Nationwide Inpatient Sample (NIS), a nationally representative database of inpatient admissions, to evaluate the early effect of the ACA young adult insurance expansion on the use of inpatient medical care in general and mental healthcare specifically, on treatment intensity, and on insurance status of inpatient visits.

Akosa et al. identify the effects of the policy on the targeted age group using a difference-in-differences method that compares the treatment group of 19 to 25-year-olds to 27 to 29-year-olds. They used the NIS data from 2007 to 2011, the latest year for which data was available at that time, to allow a sufficient look-back period to test for differences in trends between treatment and control groups. The majority of mental health hospitalizations occur in community hospitals,²⁵ but they note that specialty psychiatric hospitals and prison hospitals, which do not report data to the Agency for Healthcare Research & Quality, are also a major source of care.

They find evidence that compared to those aged 27-29 years, treated young adults aged 19-25 years increased their inpatient visits by 3.5 percent while mental illness visits increased 9.0 percent. The prevalence of uninsurance among hospitalized young adults decreased by 12.5 percent; however, it does not appear that the intensity of inpatient treatment changed despite the change in reimbursement composition of patients. This reflects similar results from the Saloner et al. paper. Evidence from the RAND health insurance experiment shows that mental health care is almost three times as responsive to

insurance generosity as other forms of health care.²⁶ This may help to explain the drastic jump in mental illness visits compared to visits overall. While this evidence pertains to outpatient care only, it might have implications for inpatient care as well. Sommers et al find evidence that the mandate increased self-reported access to care but had no statistically significant effect on self-reported usual source of care.²¹ Taken together, prior literature on the impact of health insurance on all and mental health inpatient admissions is rather mixed with some studies finding a sizable increase in use while others find little to no effects.

The ACA's Dependent Coverage Expansion and Out-of-Pocket Spending by Young Adults With Behavioral Health Conditions

Ali et al. (2016) examined the population of young adults with behavioral health conditions overall and by race and ethnicity. The objective of this study was to analyze out-of-pocket (OOP) spending as a share of total health care expenditures for young adults with behavioral health conditions before and after the implementation of the ACA dependent care provision. The study analyzed 2008-2009 and 2011-2012 nationally representative data from the Medical Expenditure Panel Survey (MEPS) with zero-or-one inflated beta regression models in a difference-in-differences framework to estimate the impact of the ACA's dependent coverage expansion.

MEPS is a nationally representative survey of the US civilian, noninstitutionalized population. It provides information about respondents' medical expenditures during the survey year, as well as their demographic characteristics,

socioeconomic characteristics, health status, and health insurance status. The study compared the treatment group of individuals ages 19-25, an unweighted sample size of 1,158 people, with a group ages 27-29, an unweighted sample size of 668 people. They found that young adults ages 19-25 with behavioral health disorders were significantly less likely than the older group to have high levels of OOP spending after the implementation of the ACA's dependent coverage expansion. The reduction was most pronounced among young adults from racial-ethnic minority groups suggesting race does play some element in access to mental health treatment.

The Affordable Care Act: Disparities in Emergency Department and Hospital Use for Mental Health Diagnosis In Young Adults

A study by Justin Lee Yanuck estimated the association between the dependent coverage provision and changes in young adults' usage of Emergency Department (ED) and Hospital services for psychiatric diagnosis. He utilized a Quasi-Experimental Analysis of ED use and inpatient admissions in California from 2009-2011 for behavioral health diagnosis of individuals aged 19 to 31-years-old. His analyses used a difference-in-differences approach comparing those targeted by the ACA dependent provision, 19-25-year-olds, and those who were not, 27-31-year-olds, evaluating changes in ED/inpatient visit rates per 1,000 in California. Primary outcome measures included the quarterly ED/inpatient visit rates with any psychiatric diagnosis, with subgroup analysis looking at the effects of race and gender on the primary outcome.

He found that while the young adult dependent provision was associated with 0.05 per 1,000 people ($p < 0.001$) fewer psychiatric ED visits among the treatment group compared to the control group, this significant reduction in psychiatric ED visits was not seen in males, Hispanics, Asians, or Pacific Islanders. Furthermore, Hispanics, Asians, and Pacific Islanders were the only racial subgroups that did not see gains in the proportion of psychiatric ED visits covered by private insurance. Additionally, inpatient visit rates did not significantly change in the treatment group relative to the control group, however after stratification, rates significantly increased for males, whites, blacks, and mixed/other racial groups. While the source of admission from the ED did not significantly change in the treatment compared to the control group, admissions from sources other than the ED significantly increased overall, as well as for whites, blacks, mixed/other, and females. Ultimately, his research shows that in one of the earliest aspects of the ACA, gender and racial disparities exist.

The Effects of the Affordable Care Act Adult Dependent Coverage Expansion on Mental Health

A major argument for improved outcomes in mental health following implementation of the ACA stems from improved financial security which is frequently a source of significant stress for the average individual. In this case, the coverage expansion improved young adults' financial protection from medical expenses and increased their mental health care use. These short-term effects signal the possibility of accompanying changes in mental health through one or more mechanisms: treatment-

induced symptom relief or improved function; improved well-being and/or reduced anxiety as financial security increases; or declines in self-reported mental health if treatment results in the discovery of illnesses.

In a study by Burns et al. they estimate the effects of this insurance coverage expansion on young adults' mental health outcomes one year after its implementation. To this end they use a difference-in-differences framework to estimate the effects of the ACA young adult dependent coverage on mental health outcomes for adults ages 23-25 relative to adults ages 27-29 from 2007-2011. The overall pattern of findings within the study suggests that both age groups experienced modest improvements in a range of outcomes that captured both positive and negative mental health following the 2010 implementation of the coverage expansion. The notable exception to this pattern is a 1.4-point relative increase in the SF-12 MCS score among young adults alone, a measure that captures emotional well-being, mental health symptoms both positive and negative, and social role functioning. This could be due in part to the study's time frame being within close proximity of the 2008 financial crisis which would have had a profound impact on young adults' sense of financial security which is frequently associated with mental health and stress. Additionally, the study found limited evidence of an accompanying improvement in mental health outcomes. The important exception being a small population-level increase in emotional well-being that may reflect a response to improved financial security and/or access to treatment. Given the short time period studied following implementation even this should be considered an important and promising improvement in mental health.

DATA DESCRIPTION

In this study I use data from the National Survey on Drug Use and Health (NSDUH). The NSDUH provides annual information on approximately 55,000 respondents to a telephone survey conducted by the Substance Abuse and Mental Health Services Administration, an agency in the United States Department of Health and Human Services. The questions cover a variety of topics with the majority focusing on substance abuse and mental health faculties. Questions are carefully worded and follow a chain of events based on respondent answers to ensure accuracy. For example, if a respondent were to answer no to a question involving having depression and/or their K6 score questions returned low enough numeric results they would not be asked further questions regarding the state of their depression etc. In this capacity the survey avoids including unaffected parties within their results which would skew the data.

My analysis uses a difference-in-differences framework to estimate the effects of the ACA young adult dependent coverage expansion on mental health outcomes for adults ages 19-25 relative to adults ages 26-29 from 2006-2013. These outcomes are captured by four main variables. First is the Kessler index (K6) monthly score of psychological distress including a breakdown of each of the six questions as well as a cumulative score. Second is the suicide ideation screening comprised of three sections including serious thoughts, plans, and attempts of suicide. Third is treatment type including inpatient, outpatient, and prescription treatment for mental health issues as well as a perceived need for mental health services and whether or not that need was met to evaluate the psychological factor behind treatment. Lastly, there is the frequency of major

depressive episodes (MDEs) including lifetime and previous year major depressive episodes and treatment.

Table 3.1: Descriptive Statistics of K6 Psychological Distress Test Results

Variable	(19-25) N= 31,747	(19-21) N=13,999	(22-25) N=17,748	(26-29) N= 5,368
Before ACA				
Level of psychological distress over the past 30 days (K6 SUM Score)	5.169 (4.667)	5.448 (4.728)	4.950 (4.606)	4.647 (4.482)
Feeling nervous	1.113 (0.961)	1.158 (0.963)	1.077 (0.958)	1.026 (0.939)
Feeling hopeless	0.675 (0.963)	0.719 (0.990)	0.641 (0.941)	0.582 (0.913)
Feeling restless or fidgety	1.037 (1.054)	1.071 (1.070)	1.010 (1.040)	0.933 (1.004)
Feeling so sad or depressed that nothing could cheer you up	0.626 (0.947)	0.678 (0.978)	0.585 (0.920)	0.542 (0.882)
Feeling that everything was an effort	1.061 (1.164)	1.126 (1.183)	1.010 (1.147)	0.979 (1.137)
Feeling down on yourself, no good, or worthless	0.658 (0.974)	0.696 (1.003)	0.628 (0.950)	0.585 (0.909)
After ACA				
	(19-25) N= 64,044	(19-21) N=27,444	(22-25) N=36,600	(26-29) N= 10,516
Level of psychological distress over the past 30 days (K6 SUM Score)	5.184 (4.724)	5.414 (4.787)	5.012 (4.668)	4.579 (4.573)
Feeling nervous	1.128 (0.971)	1.165 (0.977)	1.100 (0.965)	1.014 (0.946)
Feeling hopeless	0.663 (0.966)	0.700 (0.990)	0.635 (0.947)	0.563 (0.909)
Feeling restless or fidgety	1.024 (1.061)	1.043 (1.077)	1.011 (1.048)	0.916 (1.008)
Feeling so sad or depressed that nothing could cheer you up	0.621 (0.953)	0.664 (0.984)	0.590 (0.928)	0.530 (0.890)
Feeling that everything was an effort	1.076 (1.189)	1.134 (1.206)	1.033 (1.174)	0.980 (1.161)
Feeling down on yourself, no good, or worthless	0.672 (0.989)	0.709 (1.019)	0.644 (0.965)	0.576 (0.919)

The descriptive statistics of the K6 Psychological Distress test results in Table 3.1 illustrate the averages of survey respondents aged 19 to 25 from 2006 to 2013. This variable is based on data collected from a series of six questions known as the K6, asking

adult respondents how frequently they experienced symptoms of psychological distress during the past 30 days. Each question scales from 0 to 4 with 4 being the most severe in frequency. All six scores are added together for a cumulative psychological distress score measured out of 24. Respondents who scored 13 points or higher on the cumulative score were considered to be suffering from serious psychological distress. Further isolating the age ranges reveals psychological distress in young adults is more concentrated among 19 to 21-year-olds who also saw the greatest decline in psychological distress following improved eligibility. This trend appears to hold for all major variables of interest within this paper. A before and after ACA implementation time frame is provided for further context with before ACA comprised of results from 2006 to 2009, as the ACA was implemented in March of 2010, and after ACA comprised of results from 2010 to 2013.

Table 3.2 provides descriptive statistics of the suicide ideation screen which measures thoughts, plans, and attempts of suicide on an annual basis using a yes/no question format. A 1 is associated with yes while a 0 is associated with no.

Table 3.2: Descriptive Statistics of Suicidal Ideation Screen

Variable	(19-25) N= 31,701	(19-21) N= 13,974	(22-25) N= 17,727	(26-29) N= 5,361
Before ACA				
Seriously thought about killing self in past year	0.064 (0.245)	0.073 (0.260)	0.058 (0.233)	0.053 (0.224)
Made plans to kill self in past year	0.019 (0.137)	0.024 (0.152)	0.016 (0.124)	0.013 (0.114)
Attempted to kill self in past year	0.011 (0.106)	0.014 (0.118)	0.009 (0.095)	0.007 (0.083)
After ACA				
Variable	(19-25) N= 63,891	(19-21) N= 27,365	(22-25) N= 36,526	(26-29) N= 10,506
Seriously thought about killing self in past year	0.069 (0.254)	0.081 (0.273)	0.060 (0.238)	0.047 (0.212)
Made plans to kill self in past year	0.021 (0.144)	0.026 (0.159)	0.018 (0.131)	0.014 (0.117)

Attempted to kill self in past year	0.012 (0.110)	0.016 (0.125)	0.010 (0.097)	0.006 (0.076)
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Table 3.3 provides descriptive statistics of respondent's choice of mental health treatment if any. Treatment options include inpatient, outpatient, prescription medication, any mental health treatment as a catch-all category, and a perceived need for mental health services both in instances of treatment and no treatment.

Table 3.3: Descriptive Statistics of Adult Mental Health Treatment

Variable	(19-25) N= 31,732	(19-21) N= 13,992	(22-25) N= 17,740	(26-29) N= 5,366
Before ACA				
Received Inpatient MH Treatment	1.991 (0.097)	1.990 (0.101)	1.991 (0.093)	1.990 (0.101)
Received Outpatient MH Treatment	1.938 (0.241)	1.944 (0.230)	1.933 (0.250)	1.922 (0.268)
Received Prescription Meds for MH Treatment	1.915 (0.279)	1.923 (0.267)	1.909 (0.288)	1.887 (0.317)
Received Any MH Treatment	1.888 (0.316)	1.894 (0.307)	1.882 (0.323)	1.862 (0.345)
Perceived need / did not receive MH Treatment	1.918 (0.275)	1.923 (0.266)	1.914 (0.281)	1.915 (0.279)
Perceived unmet need & received MH Treatment	2.143 (0.618)	2.134 (0.603)	2.149 (0.628)	2.192 (0.658)
After ACA				
	(19-25) N= 63,999	(19-21) N= 27,421	(22-25) N= 36,578	(26-29) N= 10,514
Received Inpatient MH Treatment	1.989 (0.104)	1.988 (0.109)	1.990 (0.099)	1.992 (0.087)
Received Outpatient MH Treatment	1.934 (0.248)	1.937 (0.243)	1.932 (0.251)	1.926 (0.261)
Received Prescription Meds for MH Treatment	1.902 (0.297)	1.909 (0.288)	1.897 (0.304)	1.888 (0.315)
Received Any MH Treatment	1.874 (0.332)	1.879 (0.326)	1.870 (0.336)	1.864 (0.343)
Perceived need / did not receive MH Treatment	1.920 (0.271)	1.920 (0.271)	1.920 (0.272)	1.923 (0.267)
Perceived unmet need & received MH Treatment	2.171 (0.642)	2.162 (0.633)	2.178 (0.649)	2.195 (0.662)

Table 3.4 provides descriptive statistics of major depressive episodes and their treatment methods. Results are taken annually and fall into a yes/no format with 1 being associated with yes and 0 with no. Again, respondents aged 17 or younger or whose

responses were unknown or incomplete were not included. Both lifetime and past year major depressive episodes are measured along with treatment via prescription medication and whether or not the respondent saw or talked to a MD or other professional within the past year regarding their major depressive episode(s). In order for an adult to be classified as having a major depressive episode (MDE) they had to report experiencing at least 5 out of 9 criteria which were evaluated via preliminary questions within the survey. Thus, anyone who answered yes to less than 5 of the prior criteria or whom was excused for other reasons having entered valid data would not be classified as having a major depressive episode.

Table 3.4: Descriptive Statistics of Adult Major Depressive Episodes

Variable	(19-25) N= 31,648	(19-21) N= 13,958	(22-25) N= 17,690	(26-29) N= 5,354
Before ACA				
Adult: lifetime MDE	1.854 (0.353)	1.859 (0.348)	1.851 (0.356)	1.842 (0.365)
Adult: past Year MDE	1.914 (0.280)	1.915 (0.279)	1.914 (0.281)	1.914 (0.280)
Adult: saw or talked to MD/professional for MDE in past year	0.347 (0.476)	0.317 (0.466)	0.370 (0.483)	0.393 (0.489)
Adult: used RX medication for MDE	0.245 (0.430)	0.217 (0.412)	0.266 (0.442)	0.330 (0.471)
After ACA				
	(19-25) N= 63,800	(19-21) N= 27,321	(22-25) N= 36,479	(26-29) N= 10,479
Adult: lifetime MDE	1.849 (0.358)	1.852 (0.355)	1.846 (0.361)	1.844 (0.363)
Adult: past Year MDE	1.911 (0.285)	1.908 (0.288)	1.912 (0.283)	1.919 (0.273)
Adult: saw or talked to MD/professional for MDE in past year	0.368 (0.482)	0.356 (0.479)	0.377 (0.485)	0.388 (0.488)
Adult: used RX medication for MDE	0.275 (0.447)	0.252 (0.434)	0.292 (0.455)	0.310 (0.463)

I use control variables in my model to account for any differences among respondents that may have some impact on the state of their mental health as well as their choice of response and that are unrelated to healthcare policy. These include respondent sex, age, year in which the survey was taken, quarter of year in which the survey was taken, race, education level, local population density, and county type recorded as large metro, small metro, or nonmetro. Tables 3.5 and 3.6 list averages for each of these for the pre-period for the treatment and control groups in an effort to observe if there are big differences between the groups in any of these metrics going into the mandate. Overall there were little in the way of significant demographic differences between the groups that were not already expected. For example, the older control group having a significantly higher number of Bachelor's degrees makes sense given the average age for both men and women within the treatment group was 21 which would place them as still currently in college if pursuing a secondary education. The treatment group was predominantly white and possessed either a high school education or some college with the control group reflecting a similar pattern but with more bachelor's degrees onward and subsequently fewer some college reflecting natural graduation rates as many of the treatment group are not likely to have finished college yet.

All data came from included variables in the National Survey on Drug Use and Health for purposes of consistency. For 2006 and 2007 I had to use adjusted variables which had been corrected to better trend with later year variables that were being collected via a different more accurate method. I additionally had to rewrite the K6 sub variables, nervous, hopeless, restless, depressed, fatigue, and worthless to generate higher

numbers for higher frequencies as these had been reversed in the recorded data. For example, a response of all the time for frequency of nervousness initially returned a value of 1 so I rewrote it to return a value of 4 to better match the direction of measure for other variables within the paper.

Table 3.5: Descriptive Statistics for Male Respondents (Pre-Mandate)

Variable	(Age 19-25) N= 22,756 (a)	(Age 26-29) N= 3,766 (b)	Difference (a) – (b) (c)
Average Age	21***	27	6
Race			
White	0.611	0.584	0.027
African American	0.122	0.108	0.014
Native American	0.016	0.014	0.002
Pacific Islander	0.005	0.003	0.002
Asian	0.040	0.054	-0.014
Multiple Races	0.031	0.030	0.001
Hispanic	0.175	0.206	-0.031
Highest Education			
Less than High School	0.165	0.164	0.001
High School	0.348	0.305	0.043
Some College	0.354	0.253	0.101
Bachelor's Degree +	0.133	0.279	-0.146
Population Density			
CBSA greater than 1 million	0.417	0.441	-0.024
CBSA less than 1 million	0.511	0.485	0.026
Non-CBSA	0.071	0.074	-0.003
County Type			
Large Metro area	0.438	0.460	-0.022
Small Metro area	0.352	0.346	0.006
Non-Metro area	0.210	0.194	0.016

*= significant at $\alpha = 0.10$; **= significant at $\alpha = 0.05$; ***= significant at $\alpha = 0.01$

Table 3.6: Descriptive Statistics for Female Respondents (Pre-Mandate)

Variable	(Age 19-25) N= 25,197 (a)	(Age 26-29) N= 4,357 (b)	Difference (a) – (b) (c)
Average Age	21***	27	6
Race			
White	0.592	0.589	0.003
African American	0.140	0.127	0.013
Native American	0.017	0.015	0.002
Pacific Islander	0.005	0.005	0
Asian	0.038	0.046	-0.008
Multiple Races	0.030	0.029	0.001
Hispanic	0.177	0.189	-0.012
Highest Education			
Less than High School	0.130	0.142	-0.012
High School	0.313	0.256	0.057
Some College	0.391	0.277	0.114
Bachelor's Degree +	0.166	0.326	-0.160
Population Density			
CBSA greater than 1 million	0.421	0.437	-0.016
CBSA less than 1 million	0.506	0.489	0.017
Non-CBSA	0.073	0.074	-0.001
County Type			
Large Metro area	0.440	0.459	-0.019
Small Metro area	0.353	0.340	0.013
Non-Metro area	0.207	0.201	0.006

*= significant at $\alpha = 0.10$; **= significant at $\alpha = 0.05$; ***= significant at $\alpha = 0.01$

The following figures highlight the trend in one major factor taken from each of the previous tables and observes relative change over time compared to 2010, the year the ACA was implemented. Figure 1 illustrates the level of psychological distress and indicates a return to 2010 levels by 2013 following a spike in 2009. This is likely due at least in part to the 2008 financial crisis which disproportionately affected young people with 2009 and 2010 representing the worst economic years prior to a slow recovery.²⁷ For this reason, one could argue much of the psychological distress in this case stems from financial insecurity but further time trends beyond 2013 would be helpful in verifying this theory. Figure 2 illustrates an increase in reporting of suicidal thoughts from 2011

onward however while negative at face value this may be an indication that more people are simply coming forward in search of treatment rather than experiencing increased thoughts of suicide overall.

Figures 3 and 4 are somewhat conflicting with Figure 3 indicating a relative decline in mental health treatment from 2010 onward while Figure 4 reflects a sharp decline in past year major depressive episodes following 2009 which is also likely influenced by the 2008 Financial crisis. Figure 3 could be indicative of successful treatment leading to a lower use of mental health treatment overall which is mildly supported by the decline in major depressive episodes though it also entirely possible this decline is due to a capacity constraint causing a decline in access with no accompanying decline in need. Further research expanding on this time frame would likely paint a clearer picture or at least provide further insight into the credibility of either theory.

Figure 1

Treated individuals minus controls relative to 2010 outcomes

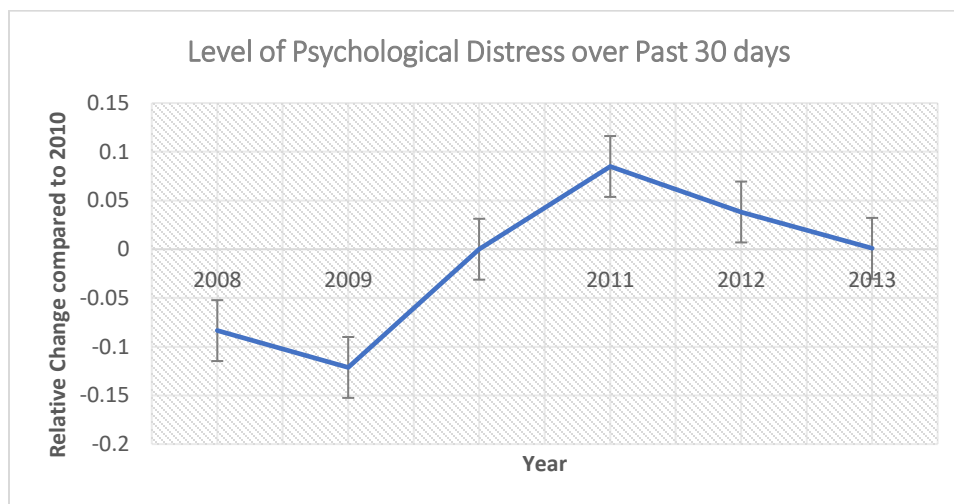


Figure 2

Treated individuals minus controls relative to 2010 outcomes



Figure 3

Treated individuals minus controls relative to 2010 outcomes

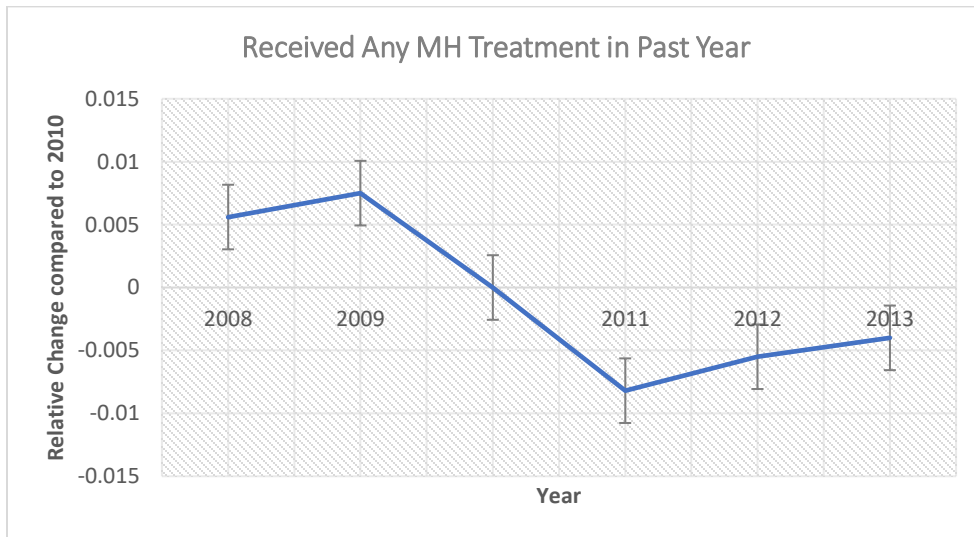
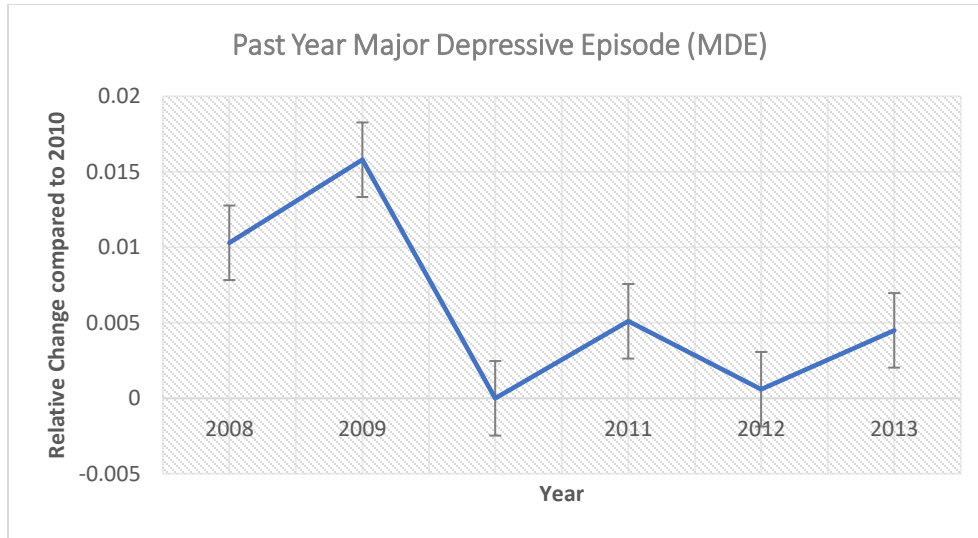


Figure 4

Treated individuals minus controls relative to 2010 outcomes



MODEL

Difference-in-Differences Model

I use a difference-in-differences model to estimate the effect of dependent care expansion on the mental health outcomes of young adults aged 19 to 25 who qualify for eligibility under the Affordable Care Act. The reason I use a difference-in-differences is that it helps to address the issue of omitted variable bias. Since we never observe what would have happened to people had they not become eligible to stay on their parent's health insurance we can use a control group of people that are similar to them on average, in this case 26 to 29-year-olds. In this way we control for all things about people we can't observe about individuals within our sample such as their true demand for health insurance, their true mental health, etc. I observe the trend pattern in outcomes from 2006

to 2013 for both my treatment group and a control group of 26 to 29 as well as a larger control group of 26 to 34. The advantage of using the 26-29 group is that it's more similar to the 19-25 experimental group making for a more appropriate comparison. However, given this model keeps ages static there is a downside in that, as time passes, some of the individuals in the control group are likely to have been treated in the past. Thus, the real effect being studied here is current access to dependent coverage, and not so much the question of having any treatment ever. Given the Affordable Care Act was implemented in 2010 this gives an approximate four-year lead in and lead out to determine where the general trend was headed and if that meaningfully changed following policy implementation.

$$Y_i = \alpha + \beta ELIG_i + \gamma AfterACA_t + \delta(ELIG_i * AfterACA_t) + \theta X + \varepsilon_i$$

In the equation above, Y_i represents the variable of interest run separately for each mental health factor measure. Alpha represents a constant baseline starting point for each respective mental health factor while β is the treatment group specific effect (this accounts for average permanent differences between treatment and control groups). Gamma represents the difference-in-differences estimate and is the parameter of interest, δ is the true effect of treatment, X represents the control variables and θ their marginal effects, and ε_i is the error term which contains all determinants of Y_i that the model omits. $ELIG_i$ is an indicator of whether or not the respondent falls within the affected age range of eligibility, in this case 19-25. I perform this analysis on different age groups among the eligible to isolate heterogeneous effects by age and vary the control group age to investigate the results' sensitivity to the control group age range. $AfterACA_t$ is an

indicator of whether the observation is from before or after the implementation of the Affordable Care Act.

RESULTS AND DISCUSSION

Difference-in-Differences Model

I use the standard *reg* command in Stata to evaluate before and after trends in multiple mental health variables controlling for respondent demographics and relative location factors such as population density. The results for serious psychological distress outcomes are in Table 5.1 for all four eligibility groups. I have divided this table with the cumulative K6 score at the top followed by a breakdown of that score across both men and women separately and then listed the separate outcomes for each of the six questions which accumulate into the total K6 score below that. Based on the standard errors of the coefficients there is no outcome significant at the 95% level with a slight degree of negative significance in the frequency of restlessness for young adults aged 19-21 at the 90% level however this has little weight on overall outcomes. The minor significance may be associated with less anxiety among young adults when it comes to concerns over a lack of coverage and the possibility of a serious medical emergency. Given the affected group also represents the younger half of young adults and the average age of college students within the United states this decline is likely due to a multitude of factors not fully captured within this model. It is unlikely these effects significantly tie back to the ACA in any substantial capacity.

Table 5.1: Difference in Difference Model with Serious Psychological Distress

as the Variable of Interest

	T: 19-25 C: 26-29 (N = 111,675)	T: 22-25 C: 26-29 (N = 70,232)	T: 19-21 C: 26-29 (N = 57,327)	T: 19-25 C: 26-34 (N = 129,012)
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Cumulative K6 – past 30 days	-.0493 (.1167)	-.0397 (.1228)	-.0589 (.1276)	.0296 (.0839)
K6 Male	-.0545 (.1670)	-.0835 (.1767)	-.0178 (.1805)	.0206 (.1190)
K6 Female	-.0394 (.1620)	0.0071 (.1694)	-.0872 (.1797)	.0337 (.1181)
Frequency of nervousness	-.0015 (.0248)	-.0032 (.0260)	.0010 (.0269)	.0158 (.0179)
Frequency of hopelessness	-.0079 (.0234)	-.0033 (.0247)	-.0139 (.0259)	-.0064 (.0170)
Frequency of restlessness	-.0346 (.0259)	-.0255 (.0274)	-.0477* (.0283)	-.0120 (.0189)
Frequency of general depression	.0002 (.0225)	.0020 (.0237)	-.0008 (.0248)	.0013 (.0161)
Frequency of mental fatigue	-.0140 (.0287)	-.0138 (.0303)	-.0124 (.0316)	.0108 (.0212)
Frequency of negative self-image	.0086 (.0236)	.0042 (.0248)	.0149 (.0260)	.0200 (.0170)

*= significant at $\alpha = 0.10$; **= significant at $\alpha = 0.05$; ***= significant at $\alpha = 0.01$

The results for the suicide ideation outcomes are in Table 5.2. I have divided this table with the cumulative result for each factor followed by a breakdown of that same outcome across both men and women separately. Based on the standard errors of the coefficients there is again no outcome significant at the 95% level however there was a slight increase in thoughts of suicide among woman aged 19-21 at the 90% level but given the lack of significant outcomes in any other area for men or women this could simply suggest that reporting of suicidal thoughts among young women slightly

improved. Given the potential for omitted variable bias in the regression it is also likely that some other factor may be influencing this slight increase outside the model.

Table 5.2: Difference in Difference Model with Suicide Ideation as the Variable of Interest

	T: 19-25 C: 26-29 (N = 111,459)	T: 22-25 C: 26-29 (N = 70,120)	T: 19-21 C: 26-29 (N = 57,206)	T: 19-25 C: 26-34 (N = 128,777)
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Seriously thought about killing self	.0040 (.0051)	.0022 (.0054)	.0067 (.0059)	-.0052 (.0039)
Male	-.0022 (.0068)	-.0022 (.0073)	-.0021 (.0079)	-.0080 (.0056)
Female	.0104 (.0075)	0.0071 (.0078)	.0160* (.0087)	0.0025 (.0054)
Made plans to kill self	-.0003 (.0027)	-.0002 (.0028)	-.00002 (.0032)	.0014 (.0020)
Male	-.0010 (.0038)	-.0009 (.0041)	-.0008 (.0043)	.0023 (.0031)
Female	.0006 (.0037)	.0007 (.0038)	.0011 (.0046)	.0006 (.0027)
Attempted to kill self	.0003 (.0018)	.0004 (.0019)	.0004 (.0023)	.0006 (.0015)
Male	.0004 (.0024)	-.0002 (.0027)	.0013 (.0030)	.0026 (.0022)
Female	.0001 (.0026)	.0010 (.0027)	-.0005 (.0034)	-.0013 (.0013)

*= significant at $\alpha = 0.10$; **= significant at $\alpha = 0.05$; ***= significant at $\alpha = 0.01$

The results for mental health treatment outcomes are in Table 5.3. I have divided this table with the cumulative result for each factor followed by a breakdown of that same outcome across both men and women separately for both factors regarding a perceived need and for receipt of any mental health treatment. I did run regressions on the first three major factors restricting to both male and female, however, the results were all statistically insignificant and so they were left out to avoid unnecessary clutter in the table. Based on the standard errors of the coefficients there are three outcomes significant

at the 95% level and another three at the 90% level. There was a significant positive change in women aged 19-25 who, perceiving a need for mental health treatment, actually received treatment and this was significant at the 95% level. When separating this aged group into 19-21 and 22-25 the 19-21 group remained significant at the 95% level while the 22-25 group was not significant. This suggests the majority of the benefit was concentrated among college age young adults who are also the most affected group for mental health rates and would logically be more impacted by an expansion in coverage.

Additionally, young adults aged 19-25 saw improvement in treatment for those with a perceived unmet need for mental health services at the 90% significance level, however, it is likely given other outcomes that the majority of this improvement was concentrated in women aged 19-21. Interestingly woman in both ages 19-25 and in the more concentrated age of 19-21 saw minor declines in receipt of any mental health services at the 90% significance level however given the limited significance of these findings accompanied with conflicting evidence with a more substantial claim this outcome is likely due to some omitted factor(s) not covered in this model. It is also possible that there is a psychological effect in play where women with a perceived need for mental health services who are provided an expanded supply of desired mental health resources are over time using fewer resources as the perceived need for them declines.

Table 5.3: Difference in Difference Model with Mental Health Treatment
as the Variable of Interest

	T: 19-25 C: 26-29 (N = 111,611)	T: 22-25 C: 26-29 (N = 70,198)	T: 19-21 C: 26-29 (N = 57,293)	T: 19-25 C: 26-34 (N = 128,945)
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Received Inpatient MH Treatment	.0012 (.0020)	.0017 (.0022)	.0005 (.0023)	-.0008 (.0017)
Received Outpatient MH Treatment	-.0087 (.0067)	-.0070 (.0070)	-.0107 (.0071)	-.0058 (.0048)
Received Prescription Meds for MH Treatment	-.0105 (.0076)	-.0089 (.0080)	-.0121 (.0081)	-.0065 (.0056)
Received Any MH Treatment	-.0136 (.0083)	-.0113 (.0088)	-.0161* (.0090)	-.0060 (.0062)
Male	-.0058 (.0103)	-.0067 (.0109)	-.0042 (.0111)	-.0090 (.0077)
Female	-.0216* (.0131)	-.0160 (.0138)	-.0288** (.0140)	-.0029 (.0096)
Perceived need / did not receive MH Treatment	.0002 (.0069)	.0047 (.0073)	-.0053 (.0075)	.0016 (.0050)
Male	-.0093 (.0090)	-.0078 (.0095)	-.0114 (.0095)	-.0082 (.0062)
Female	.0096 (.0105)	.0168 (.0111)	.0004 (.0116)	.0115 (.0077)
Perceived unmet need & received MH Treatment	.0281* (.0165)	.0280 (.0173)	.0278 (.0177)	.0135 (.0121)
Male	.0038 (.0210)	.0074 (.0221)	-.0021 (.0225)	.0094 (.0154)
Female	.0530** (.0252)	.0484 (.0265)	.0591** (.0271)	.0175 (.0184)

*= significant at $\alpha = 0.10$; **= significant at $\alpha = 0.05$; ***= significant at $\alpha = 0.01$

The results for the major depressive episode outcomes are in Table 5.4. I have divided this table with the cumulative result for each factor followed by a breakdown of that same outcome across both men and women separately for all factors except Lifetime MDE as this proved to be insignificant anyway and was a less reliable measure for change over time. Based on the standard errors of the coefficients there is one outcome

significant at the 95% level and another two at the 90% level. When comparing young adults aged 19-25 with a control group aged 26-34 there was a significant increase in the use of prescription medicine to treat major depressive episodes within the previous year at the 95% level. However, when observing the same treatment group with a control group aged 26-29 there was no statistically significant difference. What this may suggest is unclear.

Additionally, there was an increase in M.D./professional consultations for major depressive episodes as well as the use of prescription medication treatment for MDE within the previous year for woman aged 19-25 when compared to a control group aged 26-34 at the 90% significance level. When compared to a control group aged 26-29, however, there was no significant difference suggesting the cumulative outcome for prescription medication treatment for MDE is being led more by female respondents. That women saw a statistically significant increase in professional consultation for MDE as well as use of prescription medication for MDE where men did not is interesting. Whether this is due to differences in reporting, differences in actual occurrences, or other factors is unclear.

Table 5.4: Difference in Difference Model with MDE as the Variable of Interest

	T: 19-25 C: 26-29 (N = 111,281)	T: 22-25 C: 26-29 (N = 70,002)	T: 19-21 C: 26-29 (N = 57,112)	T: 19-25 C: 26-34 (N = 128,557)
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Lifetime major depressive episode (MDE)	-.0056 (.0092)	-.0016 (.0097)	-.0108 (.0099)	-.0072 (.0068)
Past year major depressive episode (MDE)	-.0050 (.0071)	-.0008 (.0075)	-.0107 (.0077)	-.0036 (.0051)
Male	-.0013 (.0090)	.0020 (.0096)	-.0062 (.0097)	-.0019 (.0065)
Female	-.0094 (.0110)	-.0045 (.0116)	-.0160 (.0122)	-.0054 (.0079)
Saw or talked to MD/professional for MDE in past year	.0343 (.0308)	.0211 (.0324)	.0529 (.0337)	.0347 (.0232)
Male	-.0090 (.0465)	-.0276 (.0500)	.0193 (.0510)	.0025 (.0366)
Female	.0579 (.0407)	.0464 (.0429)	.0710 (.0443)	.0523* (.0298)
Used RX medication for MDE in past year	.0297 (.0288)	.0263 (.0301)	.0343 (.0317)	.0458** (.0221)
Male	-.0012 (.0428)	.0025 (.0451)	-.0076 (.0474)	.0367 (.0349)
Female	.0438 (.0383)	.0349 (.0400)	.0553 (.0417)	.0471* (.0284)

*= significant at $\alpha = 0.10$; **= significant at $\alpha = 0.05$; ***= significant at $\alpha = 0.01$

CONCLUSION

Since its passage in March of 2010, the Patient Protection and Affordable Care Act has played a significant role in shaping healthcare in the United States.

Numerous studies have evaluated the different aspects and far reaching consequences of the law, with several focusing on its dependent care expansion policy. The results of this paper have found little evidence of an effect of the ACA dependent coverage expansion

on mental health treatment utilization rates and self-reported mental health among young adults outside of existing trends, with a few interesting exceptions. This lack of change in utilization is one possible reason we don't find effects on health.

It is important to note here that utilization differentiates from access in that access to mental health services may have improved for young adults, but as my results suggest, they may not be taking advantage of that newfound access. Actual usage of the services provided drives utilization. Additionally, while this paper does not directly estimate effects on financial stress, my results indicate that financial stress is either not an important determinant or the new coverage did not sufficiently relieve stress to improve mental health outcomes in this area. This suggests an important policy goal of the ACA, increasing mental health treatment and improving mental health, does not appear to be being met.

The reasons behind this may not be due to the policy itself but due to capacity constraints on mental health resources. Research by Cummings et al (2014) suggests provider capacity in areas with higher demand could be strained by the existence of new health insurance options via the ACA expansion. This coupled with more publicity about available care could be causing increases in the awareness of treatment options, and thus, the demand for mental health and substance abuse treatment. Demand could also be more pronounced among people who have not previously had access to treatment.²⁸ The lack of change in utilization is consistent with the idea of capacity constraints, although other explanations are possible.

Young adult women between the ages of 19 and 21 have appeared to benefit the most from the expansion of coverage with increases in treatment for mental health needs, in particular perceived needs, which bears further study to determine what impact psychological perceptions may be having on these outcomes. A lack of significant improvement by men across age groups presents a set of potential questions: whether there are any differences in reporting across men and women; whether mental health levels are significantly different between men and women; or if this is due to other unknown factors. It is possible the answer is a combination of these factors, but further research will be necessary to come to any substantive conclusion.

To what degree the education system is involved with young adult mental health is also unclear as college aged respondents, those aged 19 to 21, reported higher frequencies of mental health issues compared to their slightly older counterparts, those aged 22 to 25, and even more so compared to the control group of 26 to 29-year-olds. Further studies may help shed light on these results.

Overall the findings of this paper support the idea that mental health rates among young adults are mildly improving, at least among college aged individuals, but it is unclear how much of this may be attributed to the ACA and its dependent care expansion. While a few metrics suggest a significant change as a result of the policy, the majority were not statistically significant, suggesting that mental health trends were headed in that direction already or are being driven by other existing forces. Further research is needed to clarify the role the ACA has played in these growing trends.

Possible improvements on this paper could include an analysis across multiple databases rather than one, including ones within which state of residence is available to allow for better controls for potential geographic trends. A longer time trend would also be useful given the recent attention paid to mental health treatment in America which could be driving a more significant treatment effort. The ACA dependent coverage provision appears to be a stepping-stone toward increasing mental health treatment among young adults with possible mental health problems. The long-term success of this provision will depend on whether or not it links young adults needing treatment to providers in their communities and ensures continuity of treatment. To this end, an increase in mental health and medical resources may be necessary to combat a potential capacity constraint brought on by increased demand.

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