

## **The Effect of Early ACA Medicaid Expansion on Mental Health**

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**Abstract:** This article examines the effect of insurance coverage on mental health outcomes by exploiting variation in the timing of Medicaid expansion under the Affordable Care Act (ACA). Using BRFSS data from 2007 to 2013, we compare self-reported mental and physical health between individuals in seven states that enacted more generous Medicaid eligibility guidelines before the federal deadline set in the ACA with individuals in variously defined control groups. Results show that while Medicaid expansion improves mental health, it does not have a statistically significant effect on physical health in the short-run. Furthermore, the benefits of Medicaid expansion on mental health status are evident between the passage of ACA in 2010 and the actual implementation of Medicaid expansion. This suggests that insurance coverage may improve mental health status by relieving the stress associated with being uncovered.

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## **I. Introduction**

Poor mental health is recognized as an important population health issue in the United States. It is estimated that approximately 43.8 million adults age 18 or older suffered from some form of mental illness in 2013 (U.S. Department of Health and Human Services 2013). In addition to the direct cost on the well-being of individuals (as well as their families and friends), untreated mental illness also imposes significant costs on the economy. According to the President's New Freedom Commission on Mental Health, mental illness accounts for annual productivity losses valued at \$80 billion.

For many individuals, a major challenge to treating mental health disorders is the absence of adequate insurance coverage. Mental health care is particularly price sensitive (Manning et al. 1989) and more than 11 million individuals with mental health problems did not have health insurance in 2011 (Substance Abuse and Mental Health Services Administration 2012).

In addition, lack of insurance coverage can be a significant source of stress, itself a risk factor for poor mental health (Lave et al. 1998; Baicker et al. 2013). According to the 2003 Health Confidence Survey, 50 percent of Americans feel stress because of medical bills (Health Confidence Survey 2003) and 2012 survey from the American Psychological Association found that 75 percent of respondents indicated that money is their most significant cause of stress.

Thus, the Affordable Care Act (ACA), which has helped to extend coverage to millions of Americans, may have reduced the burden of poor mental health through two distinct mechanism: improved access to treatment and reduction of stress.<sup>1</sup> Therefore, this study

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<sup>1</sup> According to the federal government, 16.4 million people gained coverage under ACA as of March 2015 (ObamaCare Facts 2015).

examines the effect of Medicaid expansion under the Affordable Care Act (ACA) on mental health outcomes.

A principle motivation for the ACA, passed in March 2010, was to reduce the number of individuals without insurance coverage in the United States—there were an estimated 49.9 million uninsured Americans at the time (Kaiser Health News 2012). One of the mechanisms designed to increase coverage was an expansion of Medicaid eligibility to all households up to 138% of the federal poverty line (FPL). Previously, only children, pregnant women, needy families, the blind, parents of dependent children, individuals with disabilities and people age 65 and older could get benefit from Medicaid (Paradise 2015). The ACA, however, expanded Medicaid benefits to low income individuals younger than 65, not pregnant, non-disabled adults without children, and, was expected to provide health insurance for up to 17 million previously uninsured Americans (Angeles, 2012).

As originally passed, states were obligated to expand Medicaid eligibility by January 1<sup>st</sup>, 2014 or risk losing all federal Medicaid matching funds. The 2012 Supreme Court decision in *Florida v. Dept. of Health and Human Services* struck down this provision of the ACA as unconstitutional. Thus, expansion of Medicaid eligibility under the terms of the ACA became optional. As of October 2015, thirty-one states (including the District of Columbia) have opted to expand Medicaid. Within this group, however, seven states successfully applied for a federal waiver to expand Medicaid eligibility before the deadline established by the ACA (California,

Connecticut, Colorado, District of Columbia, Minnesota, New Jersey, and Washington). The effective expansion date for each of these early adopters are summarized in Table 1.<sup>2</sup>

Although several studies have examined the effect of ACA passage on health outcomes, these have largely focused on provisions that enabled parents to keep dependents on their policy until age 26. These studies generally find increase access and usage of medical care (Akosa Antwi, et al., 2015; Sommers et al., 2013) and better health outcomes (Chua and Sommers, 2014; Barbaresco, et al., 2015) among young adults. The effect of Medicaid expansion, which extended insurance coverage to a much broader subpopulation of working-age, low-income adults remains largely unexplored. The current study fills this gap by exploiting variation in the timing decisions of different states to expand Medicaid. Specifically, we estimate a difference-in-difference regression of health outcomes using data from the Behavioral Risk Factor Surveillance System (BRFSS) for low-income individuals less than 65 years old without children.

In a preview of our results, we find that there is a statistically significant decrease in the number of poor mental health days in early adopter states relative to the control. Interestingly, the positive effect of reform is evident between the passage of ACA in 2010 and the actual implementation of Medicaid expansion. In contrast, there is no evidence that Medicaid expansion is associated with improved physical health, at least in the short term. These findings strongly suggest an important mechanism through which Medicaid expansion improved mental health was by relieving the stress associated with lack of insurance coverage.

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<sup>2</sup> Medicaid expansion in Colorado was exceptionally limited—up to 10% of the federal poverty line—and was only expected to affect 10,000 individuals (Kaiser Family Foundation, 2012). The coefficient estimates reported subsequently are robust to the inclusion or omission of Colorado in the regression analysis.

The paper proceeds as follows. Section II provides background for Medicaid expansion. Section III explain our analysis of impact of ACA expansion on subjective well-being in addition to explanation provided for data set used in the estimation process. While section IV discusses results and implications. Section V concludes

## **II. Medicaid expansion and mental health treatment coverage**

Medicaid is a federal-state entitlement program created in 1965 as Title XIX of the Social Security Act. A complement to Medicare (Title XVIII), which entitles individuals age 65 and above to federally-provided health insurance, Medicaid targets low-income, working-age adults, children, pregnant women, and individuals with disabilities. In 2010, 54.6 million Americans were enrolled in Medicaid.

Whereas Medicare is entirely managed by the federal government, responsibility for funding and managing Medicaid is shared by state and federal governments. States are allowed to determine eligibility criteria and benefit levels, but to receive federal matching funds to reimburse program expenses, state programs must include specified health care services. For example, the Mental Health Parity Act of 1996 requires that annual and aggregate lifetime limits for mental health care can be no lower than the limits for physical health care. The Mental Health Parity and Addiction Equity Act (MHPAEA) of 2008 further expands the benefits for mental health care by increasing the number of conditions covered and reducing treatment limitations.

In addition, state Medicaid programs must cover all individuals within *categorically needy* groups. Prior to passage of ACA in 2010, this included: pregnant women up to 133 percent of the FPL; infants under age one if mother is on Medicaid at the time of birth or up to 133 percent of FPL; children age 1-5 up to 133 percent of the FPL; children age 6-18 up to 100

percent of the federal poverty level; children who are adopted or in foster care; parents and guardians below 1996 AFDC level<sup>3</sup>; recipients of Supplemental Security Income due to disability; and low-income adults eligible for Medicare (“dual enrollees”) (Klees, Wolfe, and Curtis 2009). While these are minimum coverage requirements, states also had the option of expanding coverage and receiving federal matching funds, e.g., infants and pregnant women up to 185 percent of the FPL, parents of eligible children, etc. Further, through the Children Health Insurance Program (CHIP), children up to 200 percent of the FPL can be covered under Medicaid.

Thus, prior to passage of the ACA in 2010, Medicaid was largely a program designed to assist children in low-income families and, to a lesser extent, their parents/guardians.<sup>4</sup> In an attempt to reduce the number of uninsured working-age individuals, however, the provisions of the ACA greatly expanded the scope of Medicaid by effectively defining adults under age 65 up to 138 percent of the FPL (\$15,856 for an individual or \$26,951 for a family of three in 2013) as categorically needy group regardless of the presence of children, pregnancy, or disability. As passed by Congress, states that did not expand their Medicaid program to cover these individuals would have lost the entirety of their federal Medicaid matching funds.

Twenty-one states challenged the constitutionality of the ACA on various grounds, including the proposed expansion of Medicaid. In *Florida v. Dept. of Health and Human Services*, the Supreme Court ruled in a 7-2 decision that mandatory expansion of Medicaid was

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<sup>3</sup> AFDC level does not translate directly into an income threshold. On average, the corresponding income threshold would be 40% of the FPL.

<sup>4</sup> Although the majority of Medicaid enrollees are low-income children and their parents/guardians, the majority of Medicaid expenditures are accounted for by enrollees who are elderly (Medicare dual eligibles) or disabled.

an unconstitutionally coercive use of Congressional legislative authority.<sup>5</sup> Rather, states must be provided the option of opting out of expansion without the threat of losing their pre-existing Medicaid reimbursement. As of September 2015, 31 states and the District of Columbia have expanded Medicaid eligibility under ACA guidelines, while 19 states have opted out.

Expansion of Medicaid under ACA was slated to begin in 2014. But, states were given the option of apply for a federal waiver to expand their programs earlier. Six states and the District of Columbia took advantage of this process. The timing decision of different states provides the source of variation used in this study to identify the effect of Medicaid expansion on mental health outcomes.

### ***Medicaid expansion and health outcomes***

It is worth noting that the ACA was not the first expansion of Medicaid. Researchers have examined the effect of various types of state-specific Medicaid expansion on different health outcomes. For example, Finkelstein et al. (2012) show that individuals in the treatment group, who were selected randomly in Oregon by a lottery and given an opportunity to benefit from Medicaid, were more likely use health care services, had lower out-of-pocket insurance expenditure and reported better self-reported physical and mental health comparing to the control group. In contrast, Baicker et al. (2013) conclude that the Oregon Medicaid expansion did not have a significant and positive impact on physical health outcomes within the first two years after expansion implementation year.

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<sup>5</sup> Four justices opined that the law was unconstitutional in totality (Scalia, Kennedy, Thomas, and Alito) and three (Roberts, Breyer, and Kagan) ruled expansion was constitutional with an opt-out provision. In the related case of *National Federation of Independent Business v. Sebelius*, the Supreme Court found that unconstitutional provisions of ACA were severable.

The health insurance reforms undertaken by the Commonwealth of Massachusetts in 2006 offer another useful natural experiment to examine the effect of expanding insurance coverage on health outcomes. Courtemanche and Zapata (2014) find that expansion improves individuals' self-reported physical and mental health. Similarly, Van der Wees et al. (2013) show that the health care reforms in Massachusetts were associated with improved physical and mental health.

A limitation of these studies is that they each focus on the experience of one state. The early expansion of Medicaid under ACA provides a geographically diverse mix of treatment and control states. We find strong evidence that there is an improvement in mental health in the target population (low-income, working-age adults without children) following the decision to expand Medicaid coverage, pre-dating the actual implementation of expansion. There is no such effect on physical health in treated states.

## **Data and Methods**

### ***A. Data Sources***

To effectively investigate the effects of Medicaid expansion using a difference-in-difference approach requires information on mental health outcomes across time and geography for a sufficiently large sample of individuals who had the potential to become newly eligible for Medicaid. Therefore, our primary dataset is the Behavioral Risk Factor Surveillance System (BRFSS). BRFSS is a continuing telephone survey program that collects information about health status, health behaviors, and chronic health conditions from respondents in every state and the District of Columbia. With more than 400,000 individuals interviewed annually, it is considered the largest health survey in the world. We restrict attention to BRFSS respondents

from 2007 to 2013, providing as many years of data before passage of ACA in 2010 as data between passage and the start of scheduled Medicaid expansion in 2014.

The mental health outcome measure of interest is the response to the following question: “For how many days during the past 30 days was your mental health not good?” As we are interested in potential anticipatory effects of impending Medicaid coverage through reduced stress, we also examine the relationship between physical health and Medicaid expansion, as physical health is unlikely to improve because of the prospect of coverage in the future. Thus, we utilize responses to the analogous question for physical health.

In addition to self-reported measures of mental and physical health, BRFSS also contains demographic, household structure, and household income information that allows us to determine whether a respondent would become newly eligible for Medicaid after expansion, i.e., those who would not qualify for Medicare or Medicaid prior to the passage of ACA. Specifically, we restrict the estimation sample to respondents in one- or two-person households who are less than 65 years old, do not have children, are not pregnant, are not disabled, and have household income below 250 percent of the federal poverty level for their household size (the highest income threshold selected by an early-expansion state).<sup>6</sup>

The treatment group includes the estimation sample observations from respondents in the early-expansion states with household income below the state-specific thresholds reported in Table 1. We define two control groups. First, we consider all individuals in the estimation sample from the 43 states that did not expand Medicaid prior to 2014. There is some concern,

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<sup>6</sup> Because household income is reported in intervals, when an FPL threshold falls inside an income interval, we assign all individuals within that interval as being under the threshold. By including wealthier households as being under the threshold, we would tend to underestimate the effect of coverage expansion. When we instead assign all individuals within the threshold interval as being above the threshold, our results are nearly identical.

however, that the states that decided to opt-out of Medicaid expansion after the decision in *Florida v Department of Health and Human Services* are a poor comparison group for the states that expanded Medicaid before date set forth in ACA. Hence, we define a second control group that includes the 23 states that expanded Medicaid in 2014.

Table 2 reports descriptive statistics of the treatment and control groups to establish balance between the treatment and control groups (we exclude any observations with missing data for these variables) in the pre-treatment period (2007-2010). As tables show clearly, means of outcome variables in the treated states during the pre-treatment period are very similar to those in the control states. Although there are statistically significant differences between the treated states and control states for some variables, indicating that means are statistically different from each other for the two groups, this might be due to difference in sample sizes. That said, table 2 shows that outcome variables, average bad mental and physical health days, are not statistically different from each other between the control and treated states. Treated states seem to have more Hispanic and less white population. Both groups look similar in terms of percentage of college graduates.

A potential challenge to the validity of difference-in-difference estimation is the possibility that the outcome of interest is trending differently in treatment states than in control states. Figures 1-4 plot the residual of each outcome variable from separate linear regressions of state and year dummy variables for the treatment and control states. It is clear that the pre-treatment trends in self-reported mental and physical health are similar for the treatment and control groups and that the parallel trends assumption is plausible in this context.

Figure 5 provides the histogram of responses to the mental health outcome measure: number of bad mental health days in the past 30 days. Three patterns stand out. First, the majority of respondents report no bad mental health days. Second, a significant number of respondents report that all days in the past 30 were characterized by bad mental health. Third, there are point masses at intervals of five, and to a lesser extent, seven. The physical health outcome measure offers a similar pattern.

### ***B. Empirical Methodology***

Given the outcome distributions depicted in Figures 5 and 6, our preferred specification utilizes ordered probit regression that bins outcomes into the following six categories: {0 (0 days); 1 (1-5 days); 2 (6-10 days); 3 (11-20 days); 4 (21-29 days); and 5 (30 days)}. The results reported subsequently are robust to the binning strategy employed, as well as the choice of estimator (negative binomial, two-sided tobit, OLS).

To identify the effect of Medicaid expansion under ACA on mental (physical) health, we model the number of bad mental (physical) health days as latent variable process and estimate using a difference-in-difference approach:

$$y_{ismy}^* = \beta_0 + \beta_1(T1_{sm y}) + \beta_2(T2_{sm y}) + \beta_3 X'_{ismy} + \omega_m + \delta_y + \varphi_s + \tau \rho_s + \epsilon_{ismy}$$

where  $y_{ismy}^*$  is the latent outcome of individual  $i$ , in state  $s$  in year  $y$  and month  $m$ .  $T1_{sm y}$  is the treatment indicator that equals 1 for observations from early Medicaid expansion states after their respective implementation dates; if an individual in the treatment period. Following Courtemanche and Zapata (2014) and Kolstad and Kowalski (2010), we also introduce the indicator variable  $T2_{sm y}$  that equals 1 for observations from early Medicaid expansion states in periods between March 2010, when ACA was passed, and the corresponding date when

expansion was implemented..  $X'_{ismy}$  is a vector of individual demographics, as well as the monthly state unemployment rate.  $\omega_m$ ,  $\delta_y$ ,  $\varphi_s$ ,  $\rho_s$  denote month fixed-effects, year-fixed effects, state-fixed effects, and state-specific linear time trends, respectively. Lastly,  $\epsilon_{ismy}$  is the normally distributed mean zero unobservable. All the models are estimated using weighted regressions in which BRFSS sample weights are used as a weight. Finally, we also cluster standard errors at the state level to make statistical inference robust to arbitrary forms of both heteroskedasticity and serial correlation within states over time (Bertrand et al. 2004).

## Results

The top panel of Table 3 reports marginal effects from a difference-in-differences ordered probit regression using the potential newly eligible respondents in the 43 states that did not expand Medicaid prior to 2014 as the control group for the analogous population in the 7 states that did. These results suggest that Medicaid expansion caused a statistically significant and economically meaningful shift in the mental health outcome distribution, particularly in its tails. After expanding Medicaid, the proportion of individuals reporting zero bad mental health days increased by 2.0 percentage points, while those reporting thirty bad mental health days fell by 0.9 percentage points. Interestingly, this shift predates actual implementation of Medicaid expansion, arising in the period between passage of ACA and Medicaid expansion. The marginal effects on T2 are very nearly identical to the marginal effects on T1.

The second panel of Table 3 repeats the analysis when the control group is defined only over the subset of 23 states that elected to expand Medicaid after the 2014 date originally mandated in ACA. Compared to the preceding results, the estimated effect of Medicaid expansion is slightly small, while the estimated anticipatory effect is slightly larger, but the

general pattern of a shift in the mental health distribution remains. Expanding Medicaid increases the proportion of potentially eligible individuals reporting zero bad mental health days by 1.6 percentage points and reduces the proportion reporting thirty bad mental health days by 0.8 percentage points. In the period between ACA passage and expansion, these figures are 2.4 and 1.7 percentage points, respectively.

Table 4 reports analogous estimates when the dependent variable is physical health. None of the marginal effects are statistically significant and their magnitudes are notably smaller. Interpreting the pattern of marginal effects very cautiously, it appears that if Medicaid expansion improved the short-term physical health distribution, it was a relatively weak effect and did not exhibit any evidence of an anticipatory effect.

Table 5 examines the effect of Medicaid expansion on selected subpopulations. These results suggest that the mental health benefits of Medicaid coverage were concentrated in married households. This could reflect that poor mental health has spillover effects on the mental health of other household members. Alternatively, it could reflect that the stress associated with lack of health insurance coverage is primarily associated with worries about the health of other family members. As with the main results presented in Table 3, these findings are robust to the choice of control.

Differential effects of Medicaid expansion by gender, however, are much more difficult to interpret. Although the effect of Medicaid expansion is statistically significant for females, but not males when using Control 1, the magnitude of the marginal effects are actually quite similar across gender. In contrast, when using Control 2, the magnitude for females is notably larger than the magnitude for males. This is the only result that is not robust to the choice of control. In contrast, the anticipatory effect of Medicaid expansion appears to be larger for males.

Given the distribution of bad mental health days reported earlier, Table 6 reports coefficient estimates on T1 and T2 from different estimation specifications including two-sided tobit (a continuous latent variable that is censored at both ends of the distribution), negative binomial (count data), probit (a dichotomous outcome for any bad mental health days), and OLS. Overall, these results confirm that our findings are robust to specification.

## **Conclusion**

Our results have demonstrated that expansion of Medicaid under ACA has reduced the burden of poor mental health among those who would have become newly eligible for coverage. Interestingly, there is no corresponding effect on physical health and the benefits of expansion are evident in the period between passage of ACA and actual implementation of the Medicaid early expanding states.

Together, these findings suggest that expanding insurance coverage may have important public health consequences that are not directly attributable to health care utilization. Having health insurance may mitigate worries about the availability of required in the event of a medical emergency. Alternatively, it may decrease fear that a medical emergency will lead to bankruptcy. Finally, for workers who receive health insurance through their employer, the availability of Medicaid in the event of job loss may provide additional security. Thus, expanding Medicaid to populations previously ineligible for public insurance may have reduced stress, a risk-factor for poor mental health outcomes.

There are a number of limitations worth noting that should encourage further research on this issue. Although, we can identify those individuals who would have become eligible for Medicaid, we do not know whether they would be newly covered or whether they eventually

enrolled. Because Medicaid is an entitlement program—one does not need to be enrolled prior to a medical emergency to benefit from the program—interpreting our results as the intention-to-treat effect is not nearly as restrictive. Nevertheless, exploring whether enrollees benefited more than those who do not enroll in Medicaid remains an important area of study.

A second issue is that the mental health outcome measure employed here is not a standard psychological definition. With our data, we cannot say whether the incidence of depression or major psychiatric disease fell because of Medicaid expansion. Of course, given the relatively low rates of diagnosis and treatment of mental health illness, relying solely on self-reported clinical definitions may understate the true benefits of Medicaid expansion. Future work that considered other outcome measures would be a valuable contribution to this topic.

Finally, our results suggest stress reduction may be the salient mechanism through which insurance provision improves short-term mental health outcomes. Potential longer-term benefits from better diagnosis and treatment may not be identified from our difference-in-difference approach. This is a critical distinction that certainly deserves further investigation.

Despite these caveats, the preceding results offer the first estimates of the effect of Medicaid expansion under ACA on short-term mental health outcomes and provide valuable insight into why provision of health insurance to previously uncovered populations improves public health outcomes.

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**Table 1. States Getting an Early Start on the Medicaid Expansion, April 2010 and May 2012**

<b>States</b>	<b>Effective Date</b>	<b>Income Limit</b>
California	November 1, 2010	200% FPL
Connecticut	April 1, 2010	56% FPL
Colorado	April 1, 2012	10% FPL
District Columbia	July 1, 2010	200% FPL
Minnesota	March 1, 2011	250% FPL
New Jersey	April 14, 2011	23% FPL
Washington	January 3, 2011	133% FPL

Source: <https://kaiserfamilyfoundation.files.wordpress.com/2013/01/8312.pdf>

Fig 1. Number of days mental health is not good

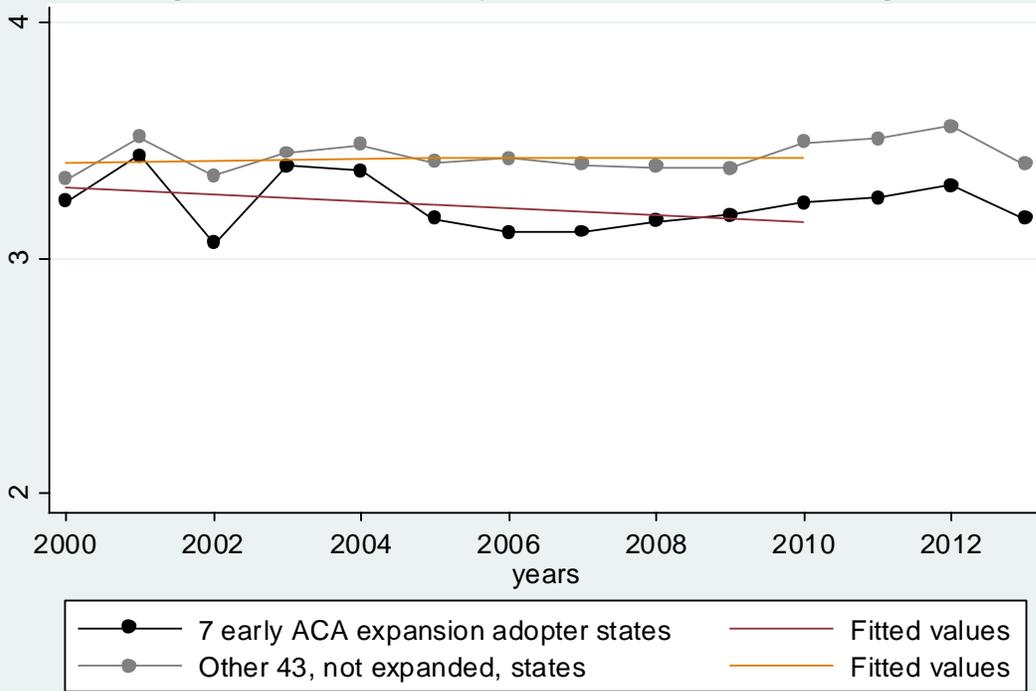


Fig 2. Number of days physical health is not good

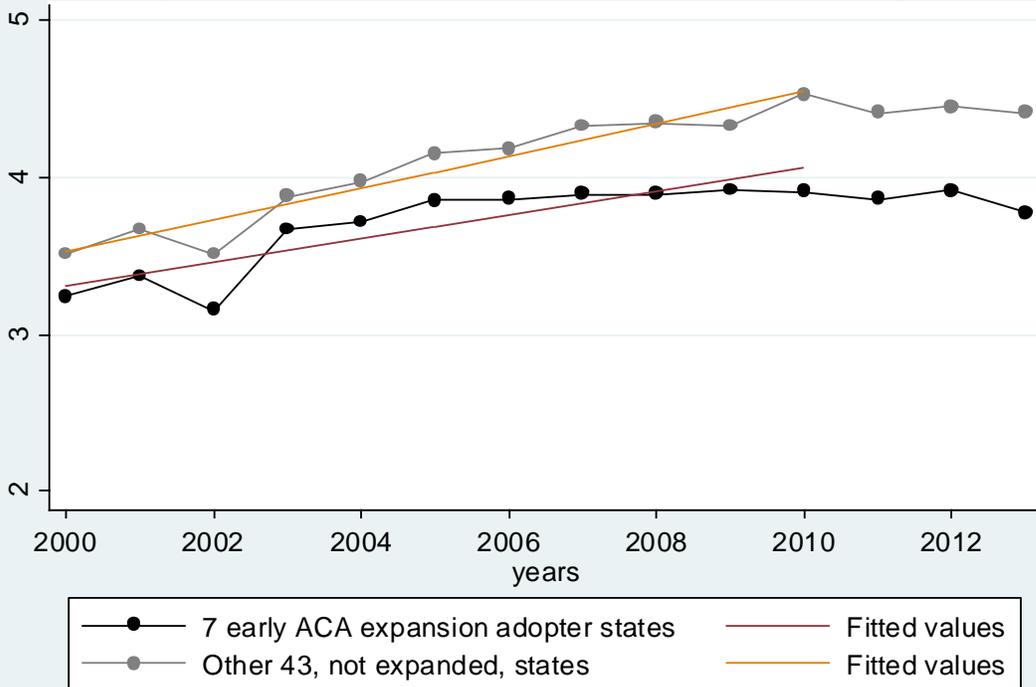


Fig 3. Number of days mental health is not good

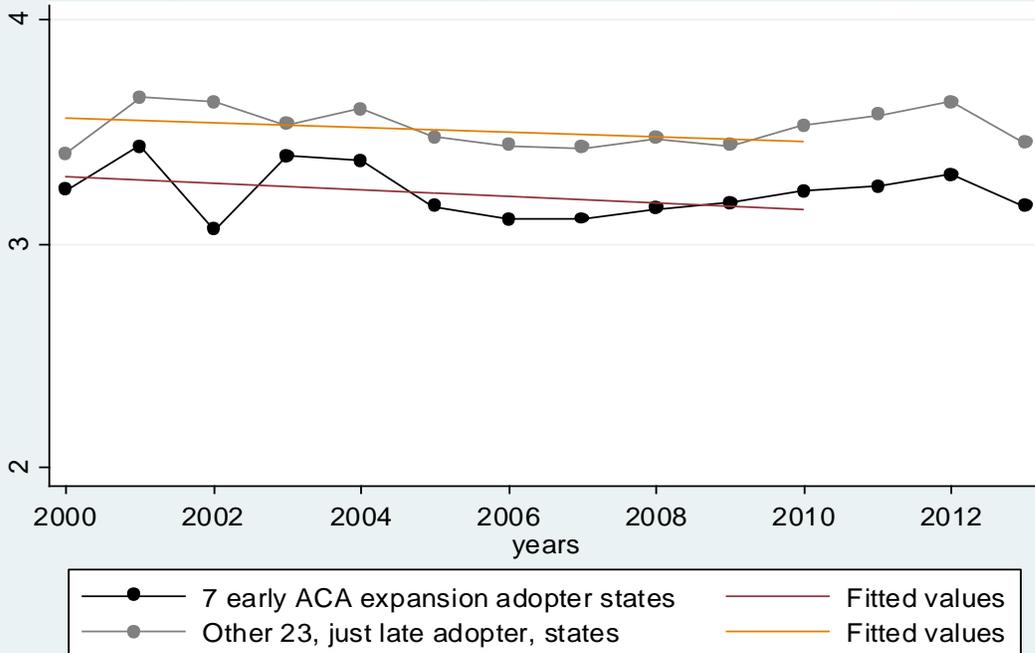
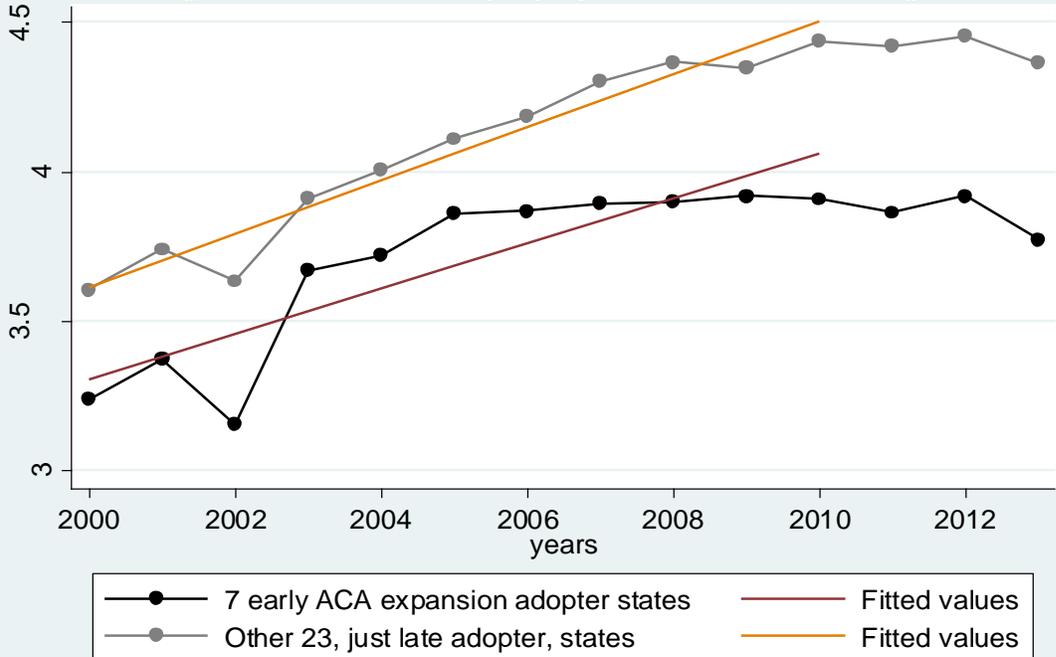
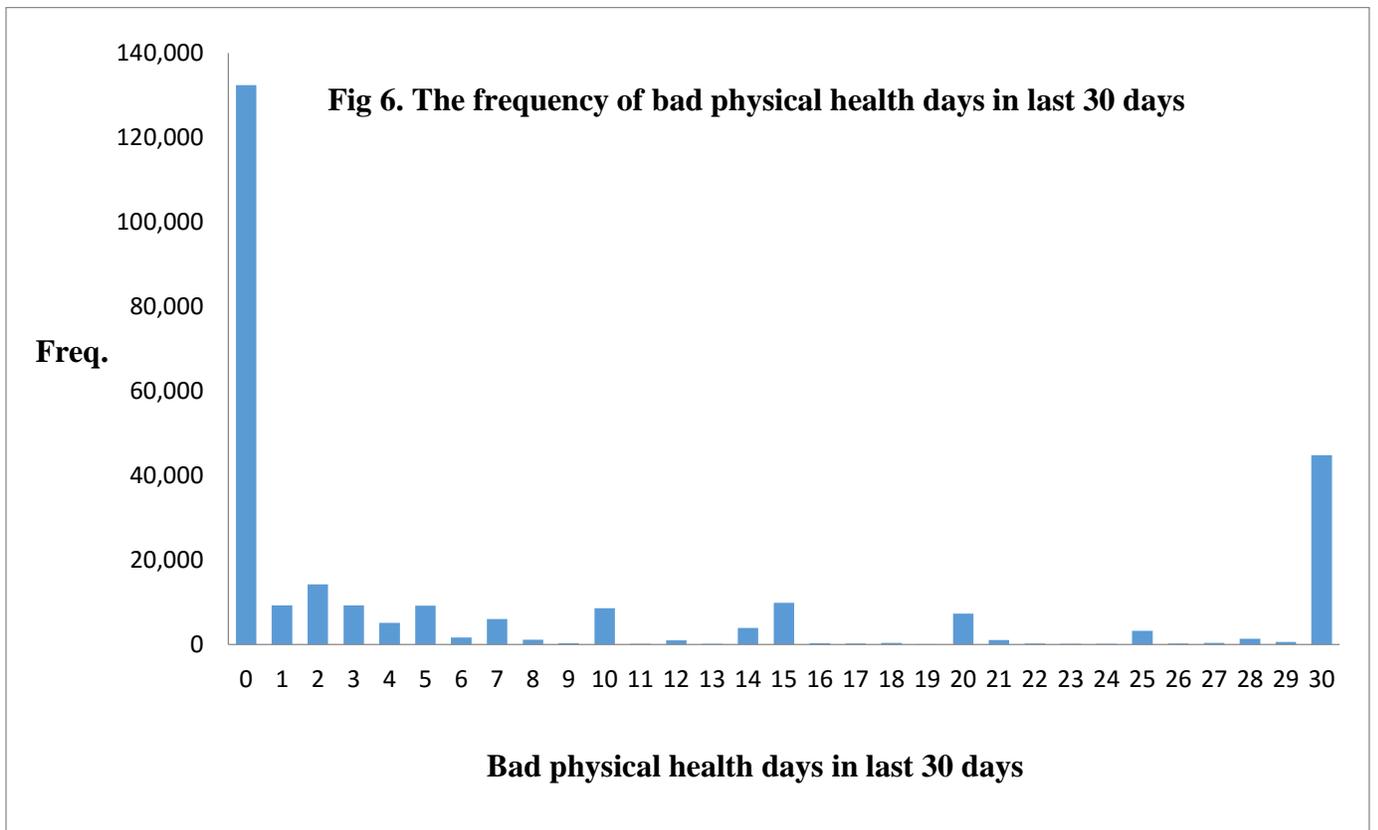
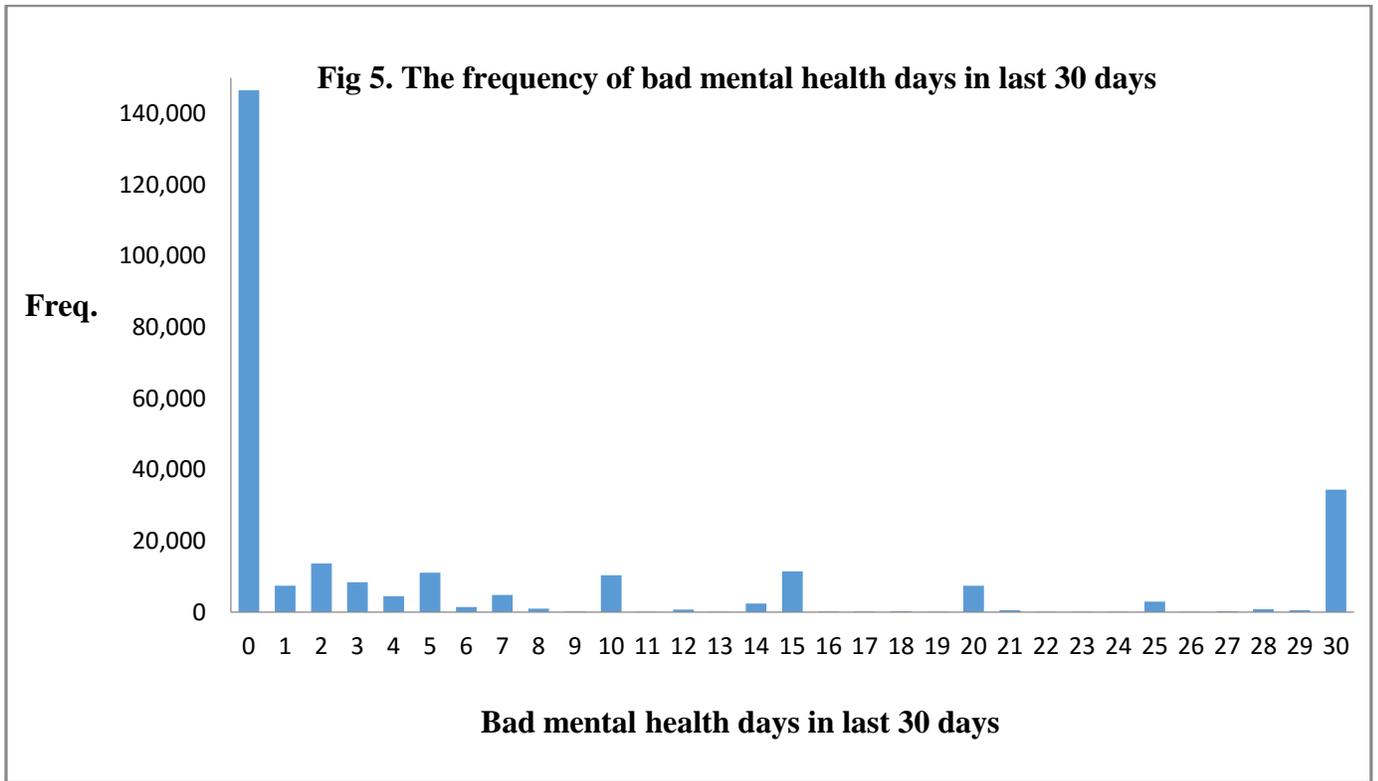


Fig 4. Number of days physical health is not good





**Table 2. Pre-Treatment Means of Variables**

Variable	Treated (n=7,989)	Control Group 1 (n=114,100)	Control Group 2 (n=52,859)
Bad mental health days in last 30 days	7.727	6.469	6.649
Bad physical health days in last 30 days	8.733	7.693	7.814
Unemployment rate	7.233	6.024***	6.278***
Age	50.779	51.854***	51.698***
Income less than \$10,000	0.363	0.153***	0.158***
Income \$10,000 to \$15,000	0.203	0.141***	0.142***
Income \$15,000 to \$20,000	0.156	0.169***	0.17***
Income \$20,000 to \$25,000	0.114	0.22***	0.217***
Income \$25,000 to \$35,000	0.122	0.317***	0.314***
Never attended school	0.003	0.002***	0.002***
Elementary school degree	0.052	0.038***	0.036***
Some high school degree	0.091	0.101***	0.092
High school graduate	0.311	0.41***	0.411***
Some college degree	0.333	0.285***	0.28***
College graduate	0.210	0.165***	0.179***
Employed for wages	0.269	0.394***	0.38***
Self employed	0.091	0.086*	0.085**
Out of work for a year	0.087	0.05***	0.056***
Out of work for less than a year	0.075	0.052***	0.057***
Homemaker	0.033	0.039***	0.038**
Student	0.036	0.018***	0.02***
Retired	0.112	0.126***	0.128***
Unable to work	0.296	0.235***	0.237***
White	0.660	0.754***	0.779***
Black	0.133	0.132	0.095***
Hispanic	0.129	0.06***	0.068***
Other	0.078	0.054***	0.057***
Male	0.401	0.379***	0.384***
Female	0.599	0.621***	0.616***
Married	0.214	0.294***	0.269***
Divorced	0.306	0.303	0.306
Widowed	0.081	0.107***	0.105***
Separated	0.049	0.042***	0.039***
Never married	0.310	0.23***	0.253***
Member of an unmarried couple	0.041	0.024***	0.028***

\*\*, and \*\*\* denote that difference between control states, and treated states is significant at 5% and 1%, respectively. Control group1 includes 43 states. Control 2 includes 23 early adopter states. BRFSS sampling weights are used to weight the observations.

**Table 3. Difference-in-Differences Ordered Probit Marginal Effects Results**

<b>A: First Control Group</b>						
Dependent variable: Bad mental health days						
	1	2	3	4	5	6
VARIABLES	>=1 and <=5	>=6 and <=10	>=11 and <=20	>=21 and <=29	==30	==0
T1 (=1 if month is after expansion in early expansion state)	-0.00293** (0.00126)	-0.00237** (0.00101)	-0.00398** (0.00171)	-0.00113** (0.000486)	-0.0101** (0.00444)	0.0206** (0.00889)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)	-0.00286* (0.00149)	-0.00231* (0.00121)	-0.00388* (0.00202)	-0.00110* (0.000582)	-0.00989* (0.00525)	0.0200* (0.0105)
Observations	271,885	271,885	271,885	271,885	271,885	271,885

<b>B: Second Control Group</b>						
Dependent variable: Bad mental health days						
	1	2	3	4	5	6
VARIABLES	>=1 and <=5	>=6 and <=10	>=11 and <=20	>=21 and <=29	==30	==0
T1 (=1 if month is after expansion in early expansion state)	-0.00229* (0.00129)	-0.00200* (0.00114)	-0.00331* (0.00188)	-0.000956* (0.000538)	-0.00797* (0.00459)	0.0165* (0.00943)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)	-0.00336* (0.00172)	-0.00293* (0.00155)	-0.00485* (0.00250)	-0.00140* (0.000726)	-0.0117* (0.00612)	0.0242* (0.0126)
Observations	137,767	137,767	137,767	137,767	137,767	137,767

Values depict marginal effects. Columns represent different cutoffs of bad mental health days; if bad mental health days in last 30 days are >=1 and <=5, >=6 and <=10, >=11 and <=20, >=21 and <=29, ==30, and ==0, respectively. All estimations also include demographics; employment, age, income, race, marital status, gender, education, state fixed effects, month fixed effects, year fixed effects and state specific linear time trends. Estimations are weighted by weights provided by BRFSS. While first control group includes all 43 states, second control group includes 23 states which adopt the reform late, in 2014. Standard errors are in parenthesis and are clustered at the state level to allow for arbitrary patterns in heteroscedasticity and correlation in errors over time in a given state. \*\*\* denotes for statistical significance at 1% level.

**Table 4. Difference-in-Differences Ordered Probit Marginal Effects Results**

**A: First Control Group**

Dependent variable: Bad physical health days in last 30 days

	1	2	3	4	5	6
VARIABLES	>=1 and <=5	>=6 and <=10	>=11 and <=20	>=21 and <=29	==30	==0
T1 (=1 if month is after expansion in early expansion state)	-0.00171 (0.00198)	-0.00128 (0.00150)	-0.00211 (0.00248)	-0.000746 (0.000877)	-0.00662 (0.00770)	0.0125 (0.0145)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)	0.000159 (0.00137)	0.000119 (0.00102)	0.000196 (0.00169)	6.96e-05 (0.000597)	0.000618 (0.00531)	-0.00116 (0.00998)
Observations	271,885	271,885	271,885	271,885	271,885	271,885

**B: Second Control Group**

Dependent variable: Bad physical health days in last 30 days

	1	2	3	4	5	6
VARIABLES	>=1 and <=5	>=6 and <=10	>=11 and <=20	>=21 and <=29	==30	==0
T1 (=1 if month is after expansion in early expansion state)	-0.00101 (0.00205)	-0.000765 (0.00156)	-0.00126 (0.00260)	-0.000450 (0.000918)	-0.00378 (0.00766)	0.00727 (0.0148)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)	-0.000585 (0.00127)	-0.000441 (0.000958)	-0.000729 (0.00158)	-0.000259 (0.000560)	-0.00218 (0.00471)	0.00419 (0.00908)
Observations	137,767	137,767	137,767	137,767	137,767	137,767

Values depict marginal effects. Columns represent different cutoffs of bad physical health days; if bad physical health days in last 30 days are >=1 and <=5, >=6 and <=10, >=11 and <=20, >=21 and <=29, ==30, and ==0, respectively. All estimations also include demographics; employment, age, income, race, marital status, gender, education, state fixed effects, month fixed effects, year fixed effects and state specific linear time trends. Estimations are weighted by weights provided by BRFSS. While first control group includes all 43 states, second control group includes 23 states which adopt the reform late, in 2014. Standard errors are in parenthesis and are clustered at the state level to allow for arbitrary patterns in heteroscedasticity and correlation in errors over time in a given state. \*\*\* denotes for statistical significance at 1% level.

**Table 5. Difference-in-Differences Ordered Probit Marginal Effects Results for Subsamples**

**A: First Control Group**

Dependent variable: Bad mental health days in last 30 days

VARIABLES		1	2	3	4	5	6
	MARRIED	>=1 and <=5	>=6 and <=10	>=11 and <=20	>=21 and <=29	==30	==0
T1 (=1 if month is after expansion in early expansion state)		-0.0131*** (0.00421)	-0.00771*** (0.00241)	-0.0129*** (0.00420)	-0.00325*** (0.00104)	-0.0292*** (0.00901)	0.0662*** (0.0208)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)		-0.0118*** (0.00314)	-0.00696*** (0.00181)	-0.0117*** (0.00312)	-0.00294*** (0.000773)	-0.0264*** (0.00652)	0.0598*** (0.0153)
Observations		77,272	77,272	77,272	77,272	77,272	77,272
	SINGLE						
T1 (=1 if month is after expansion in early expansion state)		-4.78e-05 (0.00158)	-4.76e-05 (0.00158)	-8.14e-05 (0.00270)	-2.44e-05 (0.000808)	-0.000219 (0.00725)	0.000420 (0.0139)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)		-0.000288 (0.00189)	-0.000287 (0.00188)	-0.000490 (0.00322)	-0.000147 (0.000964)	-0.00132 (0.00866)	0.00253 (0.0166)
Observations		194,613	194,613	194,613	194,613	194,613	194,613
	MALE						
T1 (=1 if month is after expansion in early expansion state)		-0.00316 (0.00255)	-0.00212 (0.00169)	-0.00344 (0.00276)	-0.000948 (0.000752)	-0.00837 (0.00682)	0.0180 (0.0146)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)		-0.0104*** (0.00207)	-0.00696*** (0.00134)	-0.0113*** (0.00217)	-0.00311*** (0.000601)	-0.0274*** (0.00589)	0.0591*** (0.0120)
Observations		103,817	103,817	103,817	103,817	103,817	103,817
	FEMALE						
T1 (=1 if month is after expansion in early expansion state)		-0.00244** (0.00118)	-0.00253** (0.00121)	-0.00445** (0.00213)	-0.00131** (0.000640)	-0.0119** (0.00577)	0.0226** (0.0109)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)		0.00181 (0.00141)	0.00188 (0.00146)	0.00330 (0.00258)	0.000969 (0.000750)	0.00881 (0.00687)	-0.0168 (0.0131)
Observations		168,068	168,068	168,068	168,068	168,068	168,068

Columns represent different cutoffs of bad physical health days; if bad physical health days in last 30 days are >=1 and <=5, >=6 and <=10, >=11 and <=20, >=21 and <=29, ==30, and ==0, respectively. All estimations also include demographics; employment, age, income, race, marital status, gender, education, state fixed effects, month fixed effects, year fixed effects and state specific linear time trends. Estimations are weighted by weights provided by BRFSS. First control group includes all 43 states. Standard errors are in parenthesis and are clustered at the state level to allow for arbitrary patterns in heteroscedasticity and correlation in errors over time in a given state. \*\*\* denotes for statistical significance at 1% level.

**Table 5-B. Difference-in-Differences Ordered Probit Marginal Effects Results for Subsamples**

**B: Second Control Group**

Dependent variable: Bad mental health days in last 30 days

		1	2	3	4	5	6
		>=1 and <=5	>=6 and <=10	>=11 and <=20	>=21 and <=29	==30	==0
<b>VARIABLES</b>	<b>MARRIED</b>						
T1 (=1 if month is after expansion in early expansion state)		-0.0112*** (0.00426)	-0.00685*** (0.00261)	-0.0107*** (0.00413)	-0.00255*** (0.000938)	-0.0225*** (0.00802)	0.0538*** (0.0199)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)		-0.0137*** (0.00416)	-0.00834*** (0.00260)	-0.0131*** (0.00415)	-0.00311*** (0.000912)	-0.0274*** (0.00791)	0.0656*** (0.0196)
Observations		36,068	36,068	36,068	36,068	36,068	36,068
	<b>SINGLE</b>						
T1 (=1 if month is after expansion in early expansion state)		0.000116 (0.00151)	0.000128 (0.00166)	0.000220 (0.00286)	6.81e-05 (0.000884)	0.000562 (0.00728)	-0.00109 (0.0142)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)		-0.000650 (0.00189)	-0.000717 (0.00208)	-0.00123 (0.00359)	-0.000382 (0.00111)	-0.00315 (0.00918)	0.00613 (0.0179)
Observations		101,699	101,699	101,699	101,699	101,699	101,699
	<b>MALE</b>						
T1 (=1 if month is after expansion in early expansion state)		0.000506 (0.00295)	0.000351 (0.00205)	0.000582 (0.00338)	0.000166 (0.000972)	0.00130 (0.00757)	-0.00291 (0.0169)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)		-0.00770*** (0.00220)	-0.00534*** (0.00157)	-0.00885*** (0.00249)	-0.00253*** (0.000695)	-0.0198*** (0.00571)	0.0442*** (0.0126)
Observations		53,819	53,819	53,819	53,819	53,819	53,819
	<b>FEMALE</b>						
T1 (=1 if month is after expansion in early expansion state)		-0.00335*** (0.00125)	-0.00395*** (0.00152)	-0.00668*** (0.00245)	-0.00196*** (0.000733)	-0.0172*** (0.00646)	0.0331*** (0.0124)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)		-0.000536 (0.00147)	-0.000632 (0.00175)	-0.00107 (0.00294)	-0.000312 (0.000865)	-0.00274 (0.00758)	0.00529 (0.0146)
Observations		83,948	83,948	83,948	83,948	83,948	83,948

Columns represent different cutoffs of bad physical health days; if bad physical health days in last 30 days are >=1 and <=5, >=6 and <=10, >=11 and <=20, >=21 and <=29, ==30, and ==0, respectively. All estimations also include demographics; employment, age, income, race, marital status, gender, education, state fixed effects, month fixed effects, year fixed effects and state specific linear time trends. Estimations are weighted by weights provided by BRFSS. First control group includes all 43 states. Standard errors are in parenthesis and are clustered at the state level to allow for arbitrary patterns in heteroscedasticity and correlation in errors over time in a given state. \*\*\* denotes for statistical significance at 1% level.

**Table 6. Difference-in-Differences with Various Model Estimations**

Dependent variable: Bad mental health days in last 30 days								
VARIABLES	First Control Group				Second Control Group			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OPROBIT	TOBIT	NBREG	OLS	OPROBIT	TOBIT	NBREG	OLS
T1 (=1 if month is after expansion in early expansion state)	-0.056** (0.024)	-1.097** (0.534)	-0.148*** (0.035)	-0.497** (0.194)	-0.045* (0.026)	-0.841 (0.570)	-0.117*** (0.038)	-0.404 (0.238)
T2 (=1 if month is after ACA passage but before expansion in early expansion state)	-0.055* (0.029)	-1.110* (0.656)	-0.131*** (0.033)	-0.472** (0.178)	-0.066* (0.034)	-1.346* (0.753)	-0.146*** (0.043)	-0.559** (0.245)
Observations	271,885	271,885	271,885	271,885	137,767	137,767	137,767	137,767

All estimations also include demographics; employment, age, income, race, marital status, gender, education, state fixed effects, month fixed effects, year fixed effects and state specific linear time trends. Estimations are weighted by weights provided by BRFSS. First control group includes all 43 states. Standard errors are in parenthesis and are clustered at the state level to allow for arbitrary patterns in heteroscedasticity and correlation in errors over time in a given state. \*\*\* denotes for statistical significance at 1% level.