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Early Effects of the Affordable Care Act on Health Care Access, Risky Health Behaviors, and Self-Assessed Health

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ABSTRACT

The goal of the Affordable Care Act (ACA) was to achieve nearly universal health insurance coverage through a combination of mandates, subsidies, marketplaces, and Medicaid expansions, most of which took effect in 2014. We use data from the Behavioral Risk Factor Surveillance System to examine the impacts of the ACA on health care access, risky health behaviors, and self-assessed health after two years. We estimate difference-in-difference-in-differences models that exploit variation in treatment intensity from state participation in the Medicaid expansion and pre-ACA uninsured rates. Results suggest that the ACA led to sizeable improvements in access to health care in both Medicaid expansion and non-expansion states, with the gains being larger in expansion states along some dimensions. No statistically significant effects on risky behaviors or self-assessed health emerge for the full sample. However, we find some evidence that the ACA improved self-assessed health among older non-elderly adults, particularly in expansion states.

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I. INTRODUCTION

The goal of the Patient Protection and Affordable Care Act (ACA) was to achieve nearly universal health insurance coverage in the United States through a combination of policies largely implemented in 2014 (Obama, 2016). Several recent studies, including Frean et al. (2016) and Courtemanche et al. (2017), have shown that the ACA led to gains in insurance coverage. The objective of this paper is to evaluate whether or not such coverage increases translated to changes in access to care, risky health behaviors, and, ultimately, short-run health outcomes.

A number of 2014 ACA provisions involved overhauling non-group insurance markets in an effort to ensure that one's health history did not provide a barrier to obtaining coverage. Specific regulations included guaranteed issue, which forbids insurers from denying coverage on the basis of applicant health status, and modified community rating, which imposes uniform premiums regardless of observable characteristics aside from age and smoking status. In addition, the federal government established a Health Insurance Marketplace to facilitate insurance purchases for individuals and small businesses. Each state was given the option of establishing their own insurance marketplace and fifteen did so in 2014 (KFF, 2014).

These reforms alone would likely lead to an adverse selection death spiral, with the influx of high cost beneficiaries causing relatively low-cost beneficiaries to drop their coverage, thus driving up premiums for those remaining in the insurance pool (Courtemanche and Zapata, 2014). This concern motivated another component of the ACA: the individual mandate. Beginning in 2014, individuals deemed to be able to afford coverage but electing to remain uncovered were penalized. The largest penalty that could be imposed was the maximum of either the total annual premium for the national average price of a Bronze exchange plan or $285

($975) in 2014 (2015).[1] In addition, an employer mandate, which required employers with 100 of more full-time equivalent employees to offer "affordable" coverage to at least 95 percent of their full-time employees and their dependents (children up to age 26) or face a penalty, took effect in 2015 (Tolbert, 2015).

The remaining challenge associated with promoting universal coverage, affordability, was addressed by the ACA in 2014 in two ways. First, sliding scale subsidies in the form of premium tax credits (PTC) became available to consumers in every state with incomes between 100 and 400 percent of the Federal Poverty Line (FPL) who did not qualify for other affordable coverage. Second, in states that opted to expand Medicaid via the ACA, anyone with income below 138 percent FPL became eligible for Medicaid coverage. Previously, Medicaid eligibility was typically restricted to those with low income among specific groups, such as children, single parents, pregnant women, the disabled, and the elderly. According to the Kaiser Family Foundation, 27 states participated in the Medicaid expansion in 2014, with three more implementing it in 2015 and another two in 2016.[2]

Theoretically, the expansion of insurance coverage brought about by the ACA should increase access to care because of the reduction in out-of-pocket prices, but this is not automatically the case. On the demand side, newly insured individuals may not have sufficient knowledge of the health care system to easily secure a regular primary care doctor. Somers and Mahadevan (2010) report that only 12 percent of adults have proficient health literacy. On the supply side, concerns have been raised about whether or not there are sufficient numbers of primary care physicians to treat all of these newly insured patients (Schwartz, 2012; Glied and

[1] The maximum increased to $2,085 in 2016. For more information, see: https://www.healthcare.gov/fees/fee-for-not-being-covered/

[2] See the following website for further information: http://kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D

Ma, 2015). While the federal government increased Medicaid primary care reimbursement rates to Medicare levels in 2013 and 2014, only a few fully maintained this "fee bump" in 2015.[3]

Insurance coverage could influence risky health behaviors – such as smoking, drinking, and overeating – in either direction (Cawley and Ruhm, 2012). On one hand, improved access to care could translate to improvements in health behaviors via information, accountability, or treatments such as smoking cessation drugs or weight loss programs. On the other hand, insurance can theoretically worsen health outcomes through *ex ante* moral hazard, as the reduction in financial risks associated with unhealthy behaviors incentivizes such behaviors. Moreover, income effects from gaining free or subsidized coverage could influence behaviors by enabling consumers to spend money they had budgeted for direct purchase of health care on alcohol, cigarettes, and junk food or, conversely, on healthy food and gym memberships (Simon et al., 2017).

The net effect of insurance on health depends on the changes in both access to care and health behaviors and therefore is also theoretically ambiguous. The extent to which insurance-induced increases in health care utilization translate to better health depend on one's initial location along the health production function. Evidence suggests that "flat of the curve" care – perhaps due to uncertainty over treatment effectiveness, the principal-agent nature of the patient-doctor relationship, fee-for-service reimbursement, lack of coordination across health care providers, or malpractice liability – is common in the U.S. (Garber and Skinner, 2008). Moreover, the same issues with health literacy that could hamper efforts by the newly insured to

[3] For more on state plans with respect to Medicaid primary care reimbursement see: http://kff.org/medicaid/perspective/the-aca-primary-care-increase-state-plans-for-sfy-2015/?elq_cid=1679210 and https://www.advisory.com/daily-briefing/2015/04/23/states-to-continue-medicaid-pay-bump.

find a primary care doctor could also limit their ability to understand and comply with treatment recommendations.[4]

The purpose of this paper is to estimate the impact of the ACA's 2014 provisions on a variety of outcomes related to health care access, risky health behaviors, and self-assessed health. In addition to estimating the overall effect of the ACA on these outcomes, we also examine differential impacts resulting from state heterogeneity with respect to the choice to expand Medicaid via the ACA.

We separately identify the effects of the private and Medicaid expansion portions of the ACA by using an identification strategy developed in Courtemanche et al. (2017) to estimate the impact of the ACA on insurance coverage by exploiting differences across local areas in pre-treatment uninsured rates. To be more specific, we estimate a difference-in-difference-in-differences (DDD) model with the differences coming from time, state Medicaid expansion status, and local area pre-treatment uninsured rate. If our objective was merely to isolate the effect of the Medicaid expansion, this could potentially be achieved with a simpler difference-in-differences model comparing changes in states that expanded Medicaid to changes in non-expansion states. However, identifying the impact of the other components of the ACA (e.g. mandates, subsidies, marketplaces) is more difficult due to their national nature. We therefore exploit an additional layer of plausibly exogenous variation arising from the fact that universal coverage initiatives provide the most intense treatments in areas with high uninsured rates.[5]

Our data come from the 2011-2015 waves of the Behavioral Risk Factor Surveillance System (BRFSS), with the sample restricted to non-elderly adults. The BRFSS is well suited for

[4] Previous literature has shown a relationship between health literacy and health outcomes including health status, chronic illnesses, and hospitalizations (Cho et al., 2008; Berkman et al., 2011).

[5] Finkelstein (2007) uses a similar strategy to identify the impacts of another national program – Medicare – on health care spending. Miller (2012a) also uses this approach to estimate the impact of the Massachusetts reform on emergency room utilization without control states.

our study for three reasons. First, it includes a wide range of questions on health care access and self-assessed health. Second, with over 300,000 observations per year it is large enough to precisely estimate the effects of state-level interventions. Third, it was among the first large-scale health datasets to release data from 2015, allowing us to examine two calendar years of data after the full implementation of the ACA.

Our results suggest that the ACA substantially improved access to health care among non-elderly adults. Gains in insurance coverage were 8.3 percentage points in Medicaid expansion states compared to 5.3 percentage points in non-expansion states, while reductions in cost being a barrier to care were 5.1 percentage points in expansion states and 2.6 percentage points in non-expansion states. The ACA also increased the probabilities of having a primary care doctor and a checkup by 3.0 and 2.4 percentage points, respectively, in non-Medicaid-expansion states, with the effects not being statistically different in expansion states. Gains in access were generally largest among individuals with lower incomes and education levels.

However, the effects of the ACA on risky health behaviors and self-assessed health were less pronounced – at least after two years. For the full sample, we observe no statistically significant impacts on any of the risky behavior or health outcomes in either Medicaid expansion or non-expansion states. We do, however, find some evidence that the ACA improved self-assessed health among older non-elderly adults, particularly in expansion states.

II. LITERATURE REVIEW

In this section we review the literature on the impacts of expansions of insurance coverage. We divide the literature into studies focusing on coverage expansions prior to 2014 and those that examine the components of the ACA implemented in 2014.

Effects of Pre-2014 Insurance Interventions

There is an extensive literature spanning several decades examining the impact of the receipt of both public and private health insurance on a variety of outcomes, including access to care, utilization, spending, risky health behaviors, and health outcomes. Additional outcomes considered in this literature include labor market participation, job lock, and other public program participation. Cutler and Zeckhauser (2000) provides a thorough review of the health insurance literature, while Buchmueller et al. (2015) reviews the literature on Medicaid and Gruber (2000) reviews the literature on health insurance and the labor market. Here we provide a brief summary of the evidence on the effects of insurance-related interventions on outcomes related to access, risky behaviors, and health.

Causally interpretable evidence on the impacts of health insurance coverage dates back to the RAND Health Insurance Experiment of the 1970s-1980s, which randomly assigned individuals to insurance plans with different coinsurance rates and deductibles. Those assigned to a plan with no cost-sharing incurred about 20 percent higher medical expenses than others (Manning et al., 1987). However, on average this additional utilization did not translate to statistically significant effects on self-assessed health, smoking, or weight (Brook et al., 1983).

A substantial portion of the literature focuses on expansions of the Medicaid program. Evidence suggests that expansions for children and pregnant women in the 1980s and 1990s reduced low birthweight (Currie and Gruber, 1996a), infant mortality (Currie and Gruber, 1996b), and avoidable hospitalizations among children (Dafny and Gruber, 2005). However, other studies suggest that these expansions increased smoking among pregnant women (Dave et al., 2015) and had inconsistent effects on their health care utilization (Epstein and Newhouse, 1998). Research has also found that Medicaid expansions for childless adults in the early 2000s

increased self-reported access to care and health while reducing mortality, particularly related to HIV (Sommers et al., 2012; Sommers, forthcoming). Studies of the randomized 2008 Oregon Medicaid lottery found that Medicaid increased health care access and utilization along a broad range of dimensions and led to large, immediate gains in self-assessed health (Finkelstein et al., 2012; Taubman et al., 2014). However, no evidence was found of changes in smoking, obesity, or clinical indicators of physical health (Baicker et al., 2013; Finkelstein et al., 2012). Tello-Trillo (2016) shows that a large Medicaid disenrollment in Tennessee reduced access to care and self-assessed health.

Another branch of the literature studies the impacts of Medicare, the universal coverage program for U.S. seniors. Evidence shows that health care utilization increases sharply at the age of eligibility (Lichtenberg, 2002; Card et al., 2008), while mortality among patients admitted to the ER falls sharply (Card et al., 2009). However, other studies suggest that Medicare does not impact mortality more generally (Finkelstein and McKnight, 2008) and slightly worsens smoking and drinking habits (Dave and Kaestner, 2009).

Several studies have focused on the 2006 Massachusetts health care reform, a universal coverage initiative that featured a combination of insurance market reforms, mandates, and subsidies similar to the ACA. Kolstad and Kowalski (2012), Miller (2012a), Miller (2012b), and Van der Wees et al. (2013) all present evidence consistent with the reform improving access to primary care. Van der Wees et al. (2013) and Courtmanche and Zapata (2014) find that the reform also improved adults' self-assessed health, though an earlier study by Yelowitz and Cannon (2010) did not observe a statistically significant result. Courtemanche and Zapata (2014) also estimate that the reform reduced body mass index (BMI). Sommers et al. (2014) present evidence that the reform reduced mortality rates, though Kaestner (2015) disputes this finding.

Finally, another series of papers investigates the effects of the first major insurance expansion to occur under the ACA: a mandate for insurers to cover dependents up to 26 years old that took effect in 2010. Evidence suggests that this dependent coverage expansion increased access to care (Sommers et al., 2013; Barbaresco et al., 2015) and general health care utilization (Chua and Sommers, 2014; Akosa Antwi et al., 2015) but not utilization of preventive services (Barbaresco et al., 2015). Chua and Sommers (2014), Barbaresco et al. (2015) and Burns and Wolfe (2016) present evidence that the dependent coverage provision improved self-assessed health along some dimensions. Finally, Barbaresco et al. (2015) document a reduction in BMI.

To summarize, the evidence from these pre-2014 interventions suggests that health insurance can impact access to care, risky behaviors, and health outcomes but that the effects often vary substantially across contexts. For instance, the effects of insurance on self-assessed health appear to have been large and immediate in the cases of the Oregon Medicaid expansion and Massachusetts reform but more modest after the ACA dependent coverage expansion and virtually nonexistent in the RAND experiment. As another example, only the Massachusetts reform and dependent coverage provision appear to have led to weight loss. This underscores the necessity of obtaining credible evidence on the effects of the 2014 components of the ACA rather than simply relying on results from other settings.

In particular, even evidence from the prior interventions that have the most in common with the ACA – Medicaid and the Massachusetts reform – may not be reliable indicators. In contrast to the narrower population targeted by Medicaid expansions, the ACA expanded coverage to a much broader range of low and middle income families and childless adults, with only part of the expansion occurring via Medicaid. Marketplace plans differ from traditional Medicaid in terms of cost-sharing and provider networks. The effects of the Massachusetts

reform and ACA could differ because of the relatively low pre-reform uninsured rate in Massachusetts, differences in the socio-demographic characteristics of those gaining coverage, the relative public enthusiasm surrounding the Massachusetts law compared to the ACA, and the fact that the entire expansion among adults was done though subsidized private coverage in Massachusetts as opposed to the mix of public and private used by the ACA (Gruber, 2008).

Effects of the 2014 Components of the ACA

Much of the early evidence on the effects of the 2014 components of the ACA focuses on changes in coverage. At the national level, simple pre-post comparisons find increases in coverage of between 2.8 and 6.9 percentage points, depending on the time frame, dataset, and population group (Long et al., 2014; Smith and Medalia, 2015; Courtemanche et al., 2016; Obama, 2016; Barnett and Vornovitsky, 2016; McMorrow et al., 2016).[6] Other recent work uses more sophisticated econometric techniques to isolate the impact of different components of the ACA on coverage. Kaestner et al. (2015) and Wherry and Miller (2016) focus on the Medicaid expansions, while Frean et al. (2016) focus on the Medicaid expansions, subsidized premiums for Marketplace coverage, and the individual mandate. Using the identification strategy that we employ in this paper, Courtemanche et al. (2017) aim to estimate the impact of the ACA more generally, finding that it increased coverage by an average of 5.9 percentage points in Medicaid expansion states compared to 2.8 percentage points in non-expansion states in 2014.

A growing number of studies examine health-related outcomes besides insurance. Shartzer et al. (2015), Polsky et al. (2015), Kirby and Vistnes (2016), Sommers et al. (2015), and Sommers and Blendon et al. (2016) show that the timing of the ACA coincided with increased access to care, while Sommers et al. (2015) also document an improvement in self-assessed

[6] Although we focus our discussion on national studies, single-state investigations generally reach similar conclusions (Sommers et al., 2014, Sommers and Chua et al., 2016, Golberstein et al., 2015; Benitez et al., 2016).

health. However, it is unclear whether estimates based only on time-series variation are able to disentangle causal effects of the ACA from other national shocks. Three papers use difference-in-differences (DD) approaches to examine the impacts of the 2014 ACA Medicaid expansion on access, health behaviors, or self-assessed health after two years.[7] Using data from the Gallup-Healthways Well-Being Index, Sommers et al. (2015) find evidence that the Medicaid expansion improved access along some dimensions but did not significantly affect self-assessed health. Abramowitz (2016) finds that the Medicaid expansion was associated with a *reduction* in self-reported overall health using data from the Current Population Survey Annual Social and Economic Supplement. Simon et al. (2017) use data from the BRFSS and find that the Medicaid expansion increased some aspects of access and preventive care use among low-income childless adults. However, they find no evidence of effects on risky health behaviors or most of their self-assessed health measures.

Relative to these previous studies, our main contribution is to present causally interpretable evidence on the effects of the full ACA – as opposed to just its Medicaid portion – on access to health care, risky health behaviors, and self-assessed health. This is critical information in light of ongoing policy debates about the future of the ACA. While we adopt the DDD strategy of Courtemanche el al. (2017), our work is distinct because we examine outcomes beyond just insurance coverage, use a second year of post-treatment data, and use a different dataset (BRFSS instead of the American Community Survey).

A secondary contribution of our work is to offer an alternative identification strategy for the impact of the Medicaid expansion that relies on weaker assumptions than the DD approach used previously. Specifically, we do not need to assume that any differential changes in the

[7] Additionally, Sommers et al. (2012) find that early Medicaid expansions under the ACA in New York, Maine, and Arizona were associated with increases in access to care and self-assessed health.

outcomes between the expansion and non-expansion states in 2014 are attributable to Medicaid. Instead, our approach allows for other factors (e.g. underlying trends or enthusiasm for the other parts of the ACA) to contribute to this differential as long as they are not correlated with pre-treatment uninsured rates.

III. DATA

Our primary data source is the BRFSS, an annual telephone survey conducted by state health departments and the U.S. Centers for Disease Control and Prevention that collects data on preventive services, risky behaviors, and self-assessed health for all 50 states and the District of Columbia. A random digit dialing method is used to select a representative sample of respondents from the non-institutionalized adult population. The BRFSS is appealing for our study because its large number of observations, over 300,000 per year, allows us to precisely estimate the effects of the treatment expansions. This is important since only a fraction of the population is affected by the change in legislation, limiting plausible effect sizes.

Our main sample consists of 19-64 year olds from the 2011-2015 waves. We exclude individuals older than 64 since the ACA was not intended to affect the health care coverage of seniors. We begin the sample in 2011 because that was the first year in which the BRFSS included cell phones in their sampling. Since individuals who exclusively use cell phones are disproportionately young, this results in a discrete change in the sample means of many of our key variables (including insurance coverage) between 2010 and 2011. An additional benefit of excluding years prior to 2011 is that this limits the sample to years after the implementation of the ACA's dependent coverage expansion, preventing confounding from differences in state dependent coverage mandates prior to the ACA.

We utilize fourteen different health-related dependent variables.[8] The first four relate to health care access: dummy variables reflecting whether the respondent has any health insurance, had any medical care needed but not obtained because of cost in the previous year, has a primary care physician, and had a well-patient doctor check-up visit (e.g. physical) in the previous year. The next three outcomes related to risky health behaviors: dummies for whether one smokes, alcoholic drinks consumed per month, and a continuous variable measuring the respondents' body weight in the form of BMI.[9] Another set of outcomes relates to self-assessed health status: a dummy for whether overall health is good or better, a dummy for whether overall health is very good or better, a dummy for whether overall health is excellent, and days of the last 30 not in good mental health, not in good physical health, and with health-related functional limitations. Self-assessed health variables, though subjective, have been shown to be correlated with objective measures of health (e.g. Idler and Benyamini, 1997; DeSalvo et al., 2006; Phillips et al., 2010). While one might initially be skeptical that insurance expansions could meaningfully affect health in their first two years, prior evidence from the randomized Oregon Medicaid experiment (Finketstein et al., 2012) and the Massachusetts universal coverage initiative (Courtemanche and Zapata, 2014; Van der Wees et al., 2013) have shown that immediate gains in self-assessed health can indeed occur.

Our last outcome variable is a summary index of health that incorporates the three health behaviors, the overall self-assessed health index, and the three self-assessments that pertain to

[8] Note that we do not utilize the screening (e.g. colonoscopy, mammogram, pap test) variables available in the BRFSS because, in almost all states, they are only available in 2012 and 2014. This means that 2014 would be the only post-treatment year, which would be especially problematic since the questions use reflection periods of a year or greater (e.g. pap test in past year). In other words, it is not clear that 2014 would be a true "post-treatment" year for these outcomes, since part of the reflection period for respondents surveyed in that year would occur prior to the ACA taking effect.

[9] Results are robust to using an indicator for obesity (BMI $\geq$ 30) rather than continuous BMI. Self-reports of weight and height are well-known to suffer from measurement error, but studies implementing a correction method involving validation data from the NHANES have repeatedly shown that adjusting for this error does not affect the signs and significance of coefficient estimates (e.g. Cawley, 2004; Courtemanche et al., 2015).

physical/mental health and functional limitations. We follow Chetty et al. (2011) and Yelowitz (forthcoming) by first transforming each variable so that a higher value represents a more desirable outcome. We then standardize each of the seven variables by subtracting the mean and dividing by its standard deviation. Finally, we sum all seven variables and divide by the standard deviation of the sum to arrive at the final index with a standard deviation of one.

We include a wide range of control variables. The controls from the BRFSS are dummy variables for age groups (5-year increments from 25-29 to 60-64, with 19-24 as the reference group), gender, race/ethnicity (non-Hispanic black, Hispanic, and non-Hispanic white with other as the reference group), marital status, education (high school degree, some college, and college graduate with less than a high school degree as the reference group), household income category ($10,000-$15,000, $15,000-$20,000, $20,000-$25,000, $25,000-$35,000, $35,000-$50,000, $50,000-$75,000, and >$75,000, with <$10,000 as the reference group), number of children in the household (zero to four with five or more as the reference group), whether the respondent reports her primary occupation as student, and whether the respondent is unemployed. We also control for the Bureau of Labor Statistics' seasonally adjusted monthly state unemployment rate as well as dummy variables for whether states set up their own insurance exchanges and whether these exchanges experienced glitches (KFF, 2014; Kowalski, 2014).

A critical variable for our identification strategy is the uninsured rate in the respondent's "local area" in the pre-treatment year of 2013. The BRFSS does not contain county level identifiers continuously throughout our period of analysis, making it impossible for us to compute county level uninsured rates during the pre-treatment periods. Instead, we use information collected on type of location within a state. The BRFSS reports whether the respondents reside in the center city of an MSA, outside the center city of an MSA but inside the

county containing the center city, inside a suburban county of the MSA, or not in an MSA. However, no location information was collected from cell-phone respondents. We use this location variable to construct four sub-groups within each state: within a central city, suburbs, non-MSA, and location unavailable (i.e. cell phone sample). Based on these within-state classifications we calculate the pre-treatment average uninsured rates by location (considering "cell phone" to be a location for the sake of convenience) within a state. In order to ensure that each area contains a sufficient number of respondents to reliably compute pre-treatment uninsured rates, we combine the seven areas with fewer than 200 respondents in 2013 with other areas.[10] After doing this, there are 194 areas with 2013 uninsured rates computed from between 219 and 5,804 respondents, with the average being 1,475 and the median being 1,205.

Our Medicaid expansion variable comes from the Kaiser Family Foundation, a non-profit organization that collects a vast array of health policy information. This information includes whether a state implemented the Medicaid expansion as well as whether this expansion was done through private insurance via a Section 1115 waiver. Expanding under the Section 115 waiver, as done by Arkansas, Iowa, and Michigan, introduced cost sharing and premiums for enrollees and could therefore have had different effects than expanding via traditional Medicaid. We attempted to test for such differences but statistical power was insufficient to draw meaningful conclusions; we therefore simply classify the Section 1115 waiver states as being Medicaid expanders. Thus a total of 27 states (including the District of Columbia) participated in the 2014 Medicaid expansion and 30 states (including the District of Columbia) expanded by the end of 2015.

In our main specifications, we simply classify the 30 states that expanded Medicaid by 2015 as the treatment group for the Medicaid expansion and the other 21 as the control group.

[10] Specifically, we combine the central city and suburban parts of Wyoming into one area, and the same for Vermont, South Dakota, and Montana. We also combine the suburban and rural parts of Massachusetts, Arizona, and California.

The majority of the expansion states implemented their expansion in January 2014, with some exceptions. Michigan's expansion took effect in April 2014 and New Hampshire's in August 2014. In 2015, Indiana and Alaska expanded Medicaid in February and September, respectively. States are classified as part of the treatment group beginning the month of their expansion.

Table 1 provides pre-treatment means and standard deviations of the dependent variables, while Online Appendix Table A1 does the same for the controls. We also report the summary statistics stratified into four groups based on whether the respondent's state expanded Medicaid and whether her local area's pre-treatment uninsured rate was above or below the median for individuals in the sample. According to Table 1, 79 percent of the sample had insurance at baseline. For both the high- and low-uninsured rate subgroups, individuals in Medicaid expansion states were slightly more likely to have insurance prior to 2014 than those in non-expansion states. Residents of Medicaid expansion states and states with pre-ACA uninsured rates below the median (column 3) had, on average, better health care access and self-assessed health than their counterparts even before the ACA was implemented. They were also more educated, more likely to be employed, and had higher incomes.

Our econometric design will account for these baseline differences, but will rely on the assumption of common counterfactual trends in the outcomes on the bases of Medicaid expansion status and pre-treatment uninsured rates. Figures 1 and 2 show that the pre-ACA trends are generally similar along these dimensions for most outcomes. Later, we will test the common trends assumption more formally through an event study analysis.

IV. ECONOMETRIC MODELS

For each outcome, our econometric objectives are to estimate the effects of both the fully implemented ACA (including the Medicaid expansion) and the ACA without the Medicaid

expansion. A major challenge in doing so is to disentangle the impacts of the nationwide components of the ACA (e.g. exchanges, mandates, subsidies) from underlying year-to-year fluctuations that would have occurred even in the law's absence. We adopt the DDD strategy Courtemanche et al. (2017) used to identify the impact of the ACA on health insurance coverage, which exploits variation across space in the intensity of treatment arising from differential pre-treatment uninsured rates. Adding this layer of geographic variation allows us to include time period fixed effects while still identifying the effects of the national (private) portion of the law.

Assuming that the extent of a geographic area's treatment is proportional to its baseline uninsured rate, the DDD model is

$$y_{iast} = \gamma_0 + \gamma_1(UNINSURED_{as} * POST_t) + \gamma_2(MEDICAID_s * POST_t) + \gamma_3(UNINSURED_{as} * MEDICAID_s * POST_t) + \boldsymbol{\gamma_4 X_{iast}} + \theta_{at} + \alpha_{as} + \varepsilon_{iast} \quad (1)$$

where

- y_{iast} is the outcome for individual *i* in area type (central city, rest of MSA, non-MSA, cell phone) *a* in state *s* in time period (month/year) *t*,
- $POST_t$ is an indicator for whether period *t* is in the post-treatment period of January 2014 or later,
- $\boldsymbol{X_{ist}}$ is a vector of control variables,
- $MEDICAID_s$ is an indicator for whether state *s* participated in the ACA's Medicaid expansion,
- $UNINSURED_{as}$ is the pre-treatment (2013) uninsured rate in area type *a* within state *s*,
- θ_{at} represents time fixed effects for each month/year*area type combination (e.g. central city in January 2011); these not only control for time as flexibly as possible but also allow time trends to evolve differentially across individuals living in central city, suburban, and rural areas as well as those with only cell phones, and

- α_{as} represents fixed effects for each geographic area (e.g. central city in Alabama).

Note that $POST_t$ is not included in the model since it is captured by the time fixed effects, while the terms $UNINSURED_{as} * MEDICAID_s$ are not separately included since they are captured by the area fixed effects.

In (1), the effect of the ACA without the Medicaid expansion is given by $\gamma_1 * UNINSURED_{as}$, which means it is assumed to be 0 in a (hypothetical) area with a 0 percent uninsured rate at baseline and to increase linearly as the pre-ACA uninsured rate rises. (We have also experimented with non-linear functional forms for the uninsured rate and found that they do not reveal any meaningful new information.) The identifying assumption is that, in the absence of the treatment, any changes in the outcomes that would have occurred in 2014-2015 would not have varied differentially by area uninsured rates, conditional on the controls. We do *not* need to assume that there would have been no changes at all in the outcomes without the ACA (conditional on the controls), as would be the case in a pre-post comparison that did not utilize the variation in pre-treatment uninsured rates.

The effect of the Medicaid expansion is given by $\gamma_3 * UNINSURED_{as}$. As with the other components of the ACA, the impact of the Medicaid expansion is now assumed to vary linearly with the state's baseline uninsured rate. (Again, we found that considering non-linear functional forms did not reveal new information.) Since the Medicaid expansion should not causally affect insurance coverage in an area with a 0 percent baseline uninsured rate, we consider γ_2 to reflect unobserved confounders rather than capturing part of the expansion's causal effect. This interpretation follows Miller (2012a) and Courtemanche et al. (2017). The identifying assumption for the impact of the Medicaid expansion is therefore that, without the ACA, differential changes in the outcomes in 2014-2015 between Medicaid expansion and non-

expansion states would not have been correlated with 2013 uninsured rates. This is a weaker assumption than would be required by a DD model, in which case one would have to assume that, conditional on the controls, there would have been *no* differential changes across expansion and non-expansion states.

Robustness Checks

We also conduct a number of robustness checks. The first several vary the set of control variables to address the possible concern that some of them could be endogenous to the ACA. Recall that the baseline model includes demographic (age, gender, and race/ethnicity), family (education, marital status, and number of children), economic (income, employment and student status, and unemployment rate), and health insurance exchange (interactions of *year* = 2014 with whether the state set up its own exchange and whether the exchange had glitches) controls. The first four robustness checks include only subsets of these variables: demographic controls only, demographic and family controls, demographic and economic controls, and demographic and exchange controls.

Next, recall that we do not know geographic area type (central city, suburbs, or rural) for individuals interviewed on a cell phone, necessitating our combining of all such individuals into a separate group within each state. The next robustness check aims to ensure that this decision does not meaningfully influence the results by dropping those interviewed on cell phones, ensuring the availability of the area type variable for everyone in the sample.

The following set of robustness checks addresses the potential concern that interacting $POST_t$ and $MEDICAID_s * POST_t$ with the same uninsured rate variable may be problematic since the Medicaid and private portions of the ACA applied to different income ranges (under 138 percent of the FPL for Medicaid, above 138 percent in Medicaid expansion states and above

100 percent in non-expansion states for the exchanges/subsidies). The first such check interacts $POST_t$ with the pre-ACA uninsured rate for respondents above 100 percent of the FPL and $MEDICAID_s * POST_t$ with the rate for those below 138 percent. Additional specifications use a 100 percent cutoff for both groups and a 138 percent cutoff for both groups.

Next, we consider alternative approaches to computing pre-treatment uninsured rates that utilize a larger number of individuals per area than our baseline strategy. This addresses possible concerns about using groups narrower than state to construct this key variable. First, we pool all three pre-treatment years when computing baseline uninsured rates rather than just using 2013 in order to increase the number of individuals in each area. Second, we drop the sub-state classifications and simply compute pre-treatment uninsured rates at the state level (using just 2013).

In another robustness check, we drop 19-25 year olds. Since this age group was treated by the 2010 ACA dependent coverage provision, their treatment status is somewhat ambiguous. With that said, Courtemanche et al. (2017) found that this age group still experienced large coverage gains in response to the 2014 ACA provisions, so we do not expect dropping 19-25 year olds to meaningfully impact our results.

The remaining robustness checks deal with the potentially ambiguous Medicaid expansion treatment status of some states. Many states partially expanded Medicaid under the ACA prior to 2014. Courtemanche et al. (2017) did not find meaningful differences in coverage gains between early expanders and states that did not expand at all until 2014, and Frean et al. (2016) find that many of the people who became eligible for Medicaid under the early expansions actually did not take up coverage until 2014. We therefore do not expect that including early expansion states as part of the treatment group will meaningfully impact the

results, but we consider alternative classifications to verify. One such approach restricts the sample to only the nine treatment states and twenty control states that did not have some form of Medicaid expansion prior to January 2014, as classified by Kaestner et al. (2015). Another uses the same nine treatment states but the full control group. Next, we only exclude the five states that Kaestner et al. (2015) describe as having comprehensive early Medicaid expansions prior to 2014. Our final robustness check drops the states that expanded Medicaid in 2014 or 2015 but whose expansion was not effective as of January 1, 2014.

V. RESULTS

Tables 2 and 3 report the results from the baseline DDD regression for each outcome. The top panel presents the coefficient estimates and standard errors for the variables of interest, while the bottom panel gives the implied effects of the ACA at the average pre-treatment uninsured rate. Indicators of statistical significance at the 0.1 percent, 1 percent, and 5 percent level are also shown.

We begin our discussion with the outcomes related to access – insurance coverage, having a primary care doctor, cost being a barrier to care in the past 12 months, and checkup in the past 12 months – which are in the first four columns of Table 2. Because the cost barrier and checkup variables reflect information from the past 12 months, treatment status in 2014 is ambiguous for these outcomes. For instance, for someone interviewed in March 2014, only three of the twelve months that determine one's answer to these questions are actually in the post-treatment period. We therefore drop 2014 in the regressions for these outcomes, explaining their smaller sample size.

The results suggest that the private portion of the ACA increased access to care along all observable dimensions. Specifically, at the average pre-treatment uninsured rate it increased the

probabilities of having insurance coverage, a primary care doctor, and a well-patient checkup by 5.3, 3.0, and 2.4 percentage points, respectively, while reducing the probability of cost being a barrier to care by 2.6 percentage points. The ACA therefore led to sizeable improvements in access even in states that did not expand Medicaid.

The Medicaid expansion led to additional gains in access along some dimensions. At the average pre-treatment uninsured rate, it increased insurance coverage by a statistically significant 3.1 percentage points and reduced the probability of reporting cost being a barrier to care by 2.5 percentage points. We do not find significant effects on having a primary care doctor or a well-patient checkup, though the magnitude for checkup is an economically meaningful 1.2 percentage points – around two-fifths as large as the effect on insurance.[11] Broadly speaking, our finding that the Medicaid expansion increased access along some but not all dimensions is consistent with the results from the DD studies by Sommers et al. (2015) and Simon et al. (2017).[12]

Combining the effects of the private and Medicaid components shows that the fully implemented ACA led to large gains in all access measures. Insurance coverage increased by 8.3

[11] Both the access variables for which we did not find statistically significant effects of the Medicaid expansion relate to primary care. One possible explanation is that newly enrolled Medicaid recipients may still have trouble accessing primary care, perhaps due to the temporary nature of the ACA Medicaid fee bump (MACPAC, 2015) leading to a smaller than expected change in physician Medicaid participation and / or some degree of access crowd-out due to the concurrent expansion of private (i.e. Marketplace) coverage. However, since the magnitude of the estimated effect on checkups is meaningfully large despite its statistical insignificance, we are reluctant to strongly push this explanation.

[12] The only noteworthy differences for specific access outcomes are that we find evidence of an effect on cost being a barrier to care but not having a primary care doctor, whereas the reverse is true for Sommers et al. (2015) and Simon et al. (2017). In our view, the difference in results for cost being a barrier to care is not a major discrepancy, as Sommers et al. (2015) and Simon et al. (2017) find the same signs and magnitudes that are only slightly smaller than ours – their estimates just do not quite reach statistical significance. The discrepancy in results for primary care doctor is more substantial, as our point estimate is essentially zero. In unreported regressions (available upon request), we replicated Simon et al.'s DD model and restriction of the sample to those with incomes below 100 percent FPL. We found that the estimated increase in probability of having a primary care doctor shrinks roughly in half (from about 4 to 2 percentage points) and becomes slightly statistically insignificant if we add the control for the state setting up its own exchange. This suggests some upward bias in the DD estimate due to unobserved differences in state attitudes toward the ACA, which we control for with our DDD approach.

percentage points, probability of having a primary care doctor rose by 3.1 percentage points, probability of cost being a barrier to care fell by 5.1 percentage points, and probability of having a checkup rose by 3.6 percentage points. Based on the pre-treatment sample means reported in Table 2, these results imply that the full ACA reduced the uninsured rate by 44 percent while also reducing the number of people without a primary care doctor by 12 percent, those with foregone care because of cost by 28 percent, and those not having an annual checkup by 10 percent.

The remaining three columns of Table 2 report the results for the three health behavior variables: BMI, probability of being a smoker, and drinks per month. We observe no statistically significant effects of the private portion, Medicaid expansion, or overall ACA on any of these outcomes. Moreover, the magnitudes are relatively small compared to those for the access outcomes: the estimated effects of the full ACA at the mean pre-treatment uninsured rate on BMI, smoking, and drinking are just 0.1 percent, 5.3 percent, and 1.8 percent of the corresponding sample means. Finally, the signs are mixed, with the full ACA reducing BMI and drinking, but increasing smoking. For these reasons, we suspect that these null results are more likely to represent "true zeros" than simply a lack of statistical power. Our findings for the Medicaid expansion are consistent with the null effects on risky behaviors found by Simon et al. (2017) using DD methods and a sample of only low-income adults.

Table 3 displays the results for the self-assessed health outcomes. We find no statistically significant effects of either the private or Medicaid components of the ACA on any of the outcomes. The implied effects of the full ACA represent just -0.4 percent, -0.4 percent, 2.5 percent, 1.4 percent, -3.7 percent, and 4.2 percent of the pre-treatment means of good or better health, very good or better health, excellent health, days not in good physical health, days not in

good mental health, and days with health-related limitations, respectively. These relatively small magnitudes, combined with the inconsistent pattern of signs, again increases our confidence that these null results reflect "true zeros." Our small and insignificant estimates contrast the large, early improvements in these same self-assessed health outcomes seen after the Massachusetts health care reform (Courtemanche and Zapata, 2014; Van der Wees et al., 2013) and randomized Oregon Medicaid experiment (Finkelstein et al., 2012). However, our null results for the Medicaid expansion are consistent with the lack of clear improvements in self-assessed health found by the DD studies in the ACA Medicaid expansion literature (Sommers et al., 2015; Abramowitz, 2016; Simon et al., 2017).

The reported results in Tables 2 and 3 only compute impacts of the ACA at the mean pre-treatment uninsured rate of 20.2 percent. Because area pre-treatment uninsured rates varied widely, ranging from 3 to 36 percent with a standard deviation of 8 percent, this approach disguises a great deal of heterogeneity. Figure 3 therefore shows how the predicted changes in our access outcomes vary across this range of uninsured rates in both expansion and non-expansion states. The effects on the health behavior and self-assessed health outcomes are never significant at any uninsured rate, so we do not present similar graphs for them.

The predicted effect of the full ACA on the probability of having insurance coverage reached as high as 14.7 percentage points in the area with the highest pre-treatment uninsured rate. Without the Medicaid expansion, this impact only reached 9.3 percentage points. The predicted impact of the full ACA on the probability of having a primary care doctor extends to 5.6 percentage points at the highest uninsured rate, with essentially no difference between Medicaid expansion and non-expansion states. For the cost barrier and well-patient checkup

outcomes, the maximum predicted effects of the ACA are 9 percentage points and 6.4 percentage points, respectively, in Medicaid expansion states and 4.5 and 4.3 in non-expansion states.

Lastly, the results for the robustness checks are available in Appendix Tables A2-A15 (one table for each outcome). In almost all cases, the findings from the baseline regressions persist across the various robustness checks.

VI. INSTRUMENTAL VARIABLES

A natural question with interpretation of the reduced-form results from the preceding section is whether we can assume the extensive margin of insurance coverage is the only mechanism through which the ACA affected the other outcomes. If this is true, then it would be reasonable to estimate an instrumental variables (IV) specification in which $UNINSURED_{as} * POST_t$ and $UNINSURED_{as} * MEDICAID_s * POST_t$ are instruments and insurance coverage is the endogenous variable.[13] This assumption is difficult to test and may not hold if, for instance, areas with higher baseline uninsured rates also had higher rates of underinsurance (e.g. bare-bones privately purchased policies), in which case the intensive margin of coverage quality is another mechanism through which our treatment variables could affect the other outcomes. Moreover, general equilibrium effects are possible; for instance, in areas with large numbers of newly insured residents, continuously covered individuals may face increased difficulty accessing providers, while those working in the health care industry may experience positive income shocks. For these reasons, we prefer to emphasize our reduced form approach as it allows for all of these mechanisms. Nonetheless, IV results can be informative about how large the effects of coverage on the outcomes would need to be for the extensive margin of coverage to be the only relevant mechanism.

[13] We are not able to estimate an IV model with both private and Medicaid coverage as endogenous variables because the BRFSS does not contain information on source of coverage.

Results from the IV model – with the full set of controls and fixed effects included – are presented in Table 4. We only report the results for the health care access outcomes since those were the only ones where significant effects emerged in the reduced form regressions.[14] In each column, we present the second-stage coefficient estimate for the health insurance variable along with its standard error, the first stage F-statistic from the test of joint significance of the two instruments, and the p-value for the overidentification test. In this case, the overidentification test essentially tests the null hypothesis that the estimated local average treatment effects of insurance would be statistically indistinguishable if either $UNINSURED_{as} * POST_t$ or $UNINSURED_{as} * MEDICAID_s * POST_t$ were used as the sole instrument. A rejection of the null could therefore mean either that the effect of gaining coverage via the Medicaid expansion is different from the effect of gaining coverage through the private component of the ACA (in which case the IV specification captures a weighted average of these two effects), or that the Medicaid and private expansions activate other mechanisms besides simply the extensive margin of coverage (in which case the IV specification would be inappropriate).

The results show that the estimated effects of insurance on the other access outcomes are large and highly significant. Specifically, insurance coverage increases the probability of having a primary care doctor by 45 percentage points and the probability of having a well-patient doctor visit by 36 percentage points, while decreasing the probability of having foregone care by 47 percentage points. To provide a reference point, IV estimates from the Oregon Medicaid experiment show that Medicaid coverage increased similar access outcomes by between 20 and 34 percentage points (Finkelstein et al., 2012). Therefore, even if our IV estimates are slightly

[14] Not surprisingly, IV estimates for the health behavior and self-assessed health outcomes are highly insignificant. These results are available upon request.

overstated because of the presence of other possible mechanisms, the results still suggest a strong effect on access from the mix of private and public coverage induced by the ACA.

We find that our instruments generally perform well in the diagnostic tests. They generate first stage F-statistics that are more than an order of magnitude above the weak instrument threshold of 10. The overidentification test only rejects the null hypothesis for primary care doctor. This is not surprising given the very different reduced-form effects of the private and Medicaid components of the ACA on the probability of having a primary care doctor presented previously.

VII. EVENT STUDY MODEL

As discussed previously, a causal interpretation of our estimates depends on two key assumptions. First, conditional on the controls, changes in our outcomes in 2014-2015 would not have been correlated with pretreatment uninsured rates in the absence of the ACA. Second, differential changes in 2014-2015 between Medicaid expansion and non-expansion states would not have been correlated with pre-treatment uninsured rates. In this section, we indirectly assess the plausibility of these assumptions by estimating an event study model that includes the interactions of the treatment variables with the full set of year fixed effects, with 2013 being the base year. The model is

$$\begin{aligned} y_{iast} = \theta_0 + \theta_1(UNINSURED_{as} * Y2011_t) + \theta_2(UNINSURED_{as} * Y2012_t) + \\ \theta_3(UNINSURED_{as} * Y2014_t) + \theta_4(UNINSURED_{as} * Y2015_t) + \theta_5(MEDICAID_s * Y2011_t) \\ + \theta_6(MEDICAID_s * Y2012_t) + \theta_7(MEDICAID_s * Y2014_t) + \theta_8(MEDICAID_s \\ * Y2015_t) + \theta_9(UNINSURED_{as} * MEDICAID_s * Y2011_t) \\ + \theta_{10}(UNINSURED_{as} * MEDICAID_s * Y2012_t) + \theta_{11}(UNINSURED_{as} \\ * MEDICAID_s * Y2014_t) + \theta_{12}(UNINSURED_{as} * MEDICAID_s * Y2015_t) \\ + \boldsymbol{\theta_{13}X_{iast}} + \alpha_{as} + \varepsilon_{iast} \end{aligned} \quad (3)$$

where $Y2011_t$, $Y2012_t$, $Y2014_t$, and $Y2015_t$ are indicators for whether year t is 2011, 2012, 2014, and 2015, respectively. The tests for differential pre-treatment trends (i.e., falsification tests) are

provided by evaluating whether the coefficients on the "treatment" variables in the pre-treatment years (θ_1, θ_2, θ_9, θ_{10}) are equal to 0.[15]

Table 5 presents the event study results for the seven outcomes related to health care access and health behaviors and Table 6 presents similar results for the seven outcomes related to self-assessed health using the full set of controls. In each table, the top panel presents the coefficient estimates of interest. Between the two tables there are a total of 56 falsification tests (four parameters of interest in each of fourteen regressions) and only three significant results at the 5 percent level. Three out of 56 is 5.3 percent, which is essentially the same as would be expected by chance. These results therefore provide some reassurance about the validity of our model to estimate causal effects for the "true" ACA.

Another advantage of the event study specification is that it allows us to distinguish between the effects of the ACA in 2014 and 2015. The most notable result is that the coverage gains from the ACA appear to have increased in the second year relative to the first year, with the increase coming entirely from the private portion. Specifically, in 2014 the fully implemented ACA increased the probability of a non-elderly adult being insured by 6.6 percentage points, with 3.9 percentage points coming from the private portion and the remaining 2.7 percentage points from Medicaid. These magnitudes are similar to those estimated by Courtemanche et al. (2017) using American Community Survey (ACS) data. In contrast, in 2015 the coverage gain from the full ACA jumped to 10.3 percentage points, with 6.3 percentage points coming from the private component and 4 percentage points from Medicaid.[16]

[15] Recall that the coefficient on the $MEDICAID_s * POST_t$ variable in our main regression was assumed to capture unobserved confounders rather than part of the causal effect of the Medicaid expansion. We therefore do not consider θ_1 and θ_2 to provide additional falsification tests.

[16] Our finding of additional coverage gains in 2015 is consistent with the Cohen et al. (2016) descriptive examination of changes over time in coverage using the National Health Interview Survey (NHIS). They report in their table 17 that among non-elderly adults, the increase in those reporting coverage of any type was 4.1 percentage points between 2013 and 2014 and 3.5 percentage points between 2014 and 2015. For public (private) coverage,

Accordingly, the gains in primary care access and reductions in cost barriers also increased in 2015 relative to 2014, though these increases appear to have come entirely from the Medicaid expansion. The event study design also causes a few sporadic results to emerge for the health behavior and self-assessed health outcomes. In particular, the fully implemented ACA increased the probability of reporting excellent self-assessed health in 2015 (but not 2014) and reduced days in poor mental health in 2014 (but not 2015). These results, however, could simply be a byproduct of the large number of hypotheses tested by the event study models.

VIII. SUBSAMPLE ANALYSES

One possible explanation for the large number of null results, particularly for the Medicaid expansion, might be that the full sample includes various groups of people with different probabilities of being treated by the ACA. In this section, we examine whether more effects show up if we "zoom in" on the subpopulations most likely to experience larger gains in coverage (those with low-to-middle incomes and those with relatively low education levels) and / or larger gains in health and related outcomes (older, but not yet elderly adults) as a result of the ACA. We do this by running subsample regressions for those below versus above the median household income, those without a college degree versus college graduates, and those below versus above the median age. Unfortunately, perhaps due to the demanding nature of the DDD specification and the need for each subsample to have sufficient numbers of individuals in each area to reliably compute pre-treatment uninsured rates, splitting the sample into three or more groups results in estimates that are too imprecise to be useful. This is also why we do not stratify by race/ethnicity: the sample sizes for minority groups such as blacks and Hispanics are not sufficient to obtain meaningfully precise results.

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their table 18 (19) suggests the increase was 1 (3.1) percentage points between 2013 and 2014 and 1.2 (2.4) percentage points between 2014 and 2015.

Tables 7-12 report the results. Tables 7 and 8 stratify the sample by income. It is reassuring that the sizable gains in access were concentrated in the below-median-income subsample. The increase in insurance coverage from the full ACA was 11.9 percentage points for the lower income group – with the majority of this increase coming from the Medicaid expansion – compared with 2.0 percentage points for the higher income group. The gains in the other access outcomes appear to have been entirely concentrated among the lower income subsample. For this group, the effects on having a primary care doctor and an annual checkup were driven mostly by the private portion of the ACA while the reduction in cost barriers is driven mostly by the Medicaid expansion.

The results on risky health behaviors and self-assessed health generally show the same null effects we saw in Table 3, with a few exceptions. For instance, among the lower income subsample, the private portion of the ACA increased drinks per month while the Medicaid expansion decreased drinking by a similar amount. Additionally, the Medicaid expansion increased smoking among the higher income subsample – a result that seems likely to be spurious since this group would not have qualified for Medicaid. A couple improvements in the self-assessed health outcomes emerge for the lower income subsample: an increase in the probability of reporting excellent health in non-Medicaid-expansion states and a reduction in days not in good mental health in expansion states. However, we are reluctant to emphasize these results since they do not seem to fit a broader pattern, and we would expect a couple significant "effects" to emerge simply by chance given the large number of null hypotheses we are testing in these tables.

The patterns in Tables 9 and 10 – for those with less education versus more education – largely mimic the findings from our income stratification analysis. For those with less than a

college degree (which includes young individuals who may still be enrolled in school), the private portion of the ACA increased access to having a primary care doctor and an annual checkup; both the Medicaid and private portions increased insurance coverage and reduced cost barriers. Again, very few of the remaining outcomes on risky health behaviors or self-assessed health appear to have been affected. For those with a college degree, there are some muted effects on having a primary care doctor and cost barriers, but we largely see insignificant results.

Tables 11 and 12 divide the sample by age, where the median individual in our sample was approximately 43 years old. For both young and old, there were sizable gains in coverage: 8.5 percentage points from the full ACA for younger individuals and 7.2 percentage points for older ones. The full ACA also significantly increased the other access outcomes by roughly similar amounts among the two groups. However, there appears to be substantial heterogeneity in the extent to which these gains in access translated to improvements in health. There were no significant impacts of the private or public expansions in insurance on any risky health behavior or self-assessed health outcomes for the younger adults. In contrast, for the older half of our sample, the full ACA led to significant reductions in reports of days not in good physical health, not in good mental health, and with health-related limitations as well as an improvement in the composite health index. These gains appear to come mostly from the Medicaid rather than the private expansion. The evidence is less clear for the five-point self-reported measure of overall health: the private portion of the ACA increased the probabilities or reporting very good or excellent health, but the estimated effects of Medicaid expansion largely offset these gains so that the effects of the full ACA were insignificant. Nonetheless, the overall pattern of results appears to suggest an improvement in self-assessed health among the older half of our non-elderly adult sample along at least some dimensions.

IX. DISCUSSION

In this paper, we used data from the Behavioral Risk Factor Surveillance System to examine the effects of the 2014 ACA provisions on health care access, risky health behaviors, and self-assessed health. Using a DDD strategy that exploits variation in time, pre-treatment uninsured rates, and state Medicaid expansion status, we separately estimated the effects in both Medicaid expansion and non-expansion states. The results suggest that the ACA improved access to care along all observable dimensions – including health insurance coverage, having a primary care doctor and a well-patient checkup in the past year, and cost barriers – in both expansion and non-expansion states. The gain in coverage and reduction in cost barriers were significantly greater in expansion states. The magnitudes of the estimates imply effects of insurance on health care access that are at least as large as those observed in the Oregon Medicaid experiment. We did not observe any statistically or economically significant effects on the outcomes related to health behaviors or self-assessed health for the full sample of non-elderly adults. However, we did find evidence that the ACA improved self-assessed health among the older half of the sample in expansion states.

Our lack of significant results for risky health behaviors suggest that the *ex ante* moral hazard, improved access to health behavior-promoting medical care, and income effects brought about by insurance coverage either offset each other or are all relatively small. The extent of *ex ante* moral hazard may be modest because the consumption value of good health may be a sufficient deterrent even if an individual is insulated from the financial consequences of illness. Improved access to medical care may be of only limited value with regard to health behaviors since they are generally not as easy to treat as acute conditions. Income effects may also be relatively small given the mixed results in the literature as to the causal impact of income on

health behaviors and the potential for individuals to value in-kind spending on health insurance at less than its cost.[17,18]

Our inability to find clear evidence that the ACA improved self-assessed health contrasts the large, immediate gains in similar outcomes observed after the Oregon Medicaid experiment (Finkelstein et al., 2014) and Massachusetts reform (Van der Wees et al., 2013; Courtemanche and Zapata, 2014). The Oregon experiment was a unique context in that it was purely among low-income individuals who had demonstrated some interest in their health by actively registering for the lottery. The effects of the Massachusetts reform could plausibly differ from those of the ACA for several reasons, including differences in population demographics, the fact that the Massachusetts reform's insurance expansions for adults were done completely through private coverage as opposed to a mix of public and private coverage, and the greater prevalence of high deductibles in the ACA's private plans (Wharam et al., 2013). Another possible explanation is the relative lack of popularity of the ACA compared to these other interventions.[19] It has been hypothesized that the large, immediate gains in self-assessed health after insurance expansions may be attributable at least in part to a "warm glow" from gaining coverage (e.g. winning the lottery in Oregon, receiving insurance through a popular program in Massachusetts) rather than from actually utilizing additional medical care (Finkelstein et al., 2012;

[17] See Cawley and Ruhm (2012) for an overview of the literature on the effect of income on risky health behaviors. Subsequent to their literature review, additional papers using natural experiments have continued to find mixed results (e.g. Au and Johnston, 2015; Averett and Wang, 2013; Kenkel et al., 2014; Apouey and Clark, 2015; Adams et al., 2012; Cowan and White, 2015).

[18] Around 84 percent of individuals with a Marketplace plan in 2015 qualified for an advance premium tax credit; conditional on qualifying, the advance PTC was $272 per month. See https://www.cms.gov/Newsroom/MediaReleaseDatabase/Fact-sheets/2016-Fact-sheets-items/2016-03-11.html. Gallen (2015) finds that each $1.00 of Medicaid spending is valued at $0.26-$0.35 to participants.

[19] Blendon et al. (2008) report that in June 2008, two years after the implementation of the Massachusetts health care reform, 69 percent of residents supported the law. In contrast, a tracking poll conducted by the Kaiser Family Foundation stated that in December 2016 only 43 percent of adults viewed the ACA favorably. For further information, on this poll see: http://kff.org/interactive/kaiser-health-tracking-poll-the-publics-views-on-the-aca/#?response=Favorable--Unfavorable&aRange=twoYear.

Courtemanche and Zapata, 2014). Perhaps the amount of "warm glow" is smaller if the intervention bringing about the coverage is controversial, such as with the ACA.

Several caveats of our work provide directions for future research. For instance, investigation of clinical health outcomes is necessary to provide a fuller picture of the ACA's health effects. Additionally, future studies should continue to track the indicators used in our paper over a longer time period, as the effects of insurance on health could take many years to fully materialize. Next, our identification strategy implicitly assumes that effects of the ACA are concentrated among those who lacked coverage prior to the law's implementation. Future research should investigate whether impacts could also occur among, for instance, those who switched from catastrophic to more comprehensive coverage as a result of the ACA's minimum standards for insurance plans, or who experienced significant income shocks as a result of the subsidies or changes in premiums.[20] Finally, note that understanding the ACA's effects on health care access and health outcomes provides only part of the story with regard to evaluating the welfare effects of the law. For instance, protection against financial risk is a critical component of the gains from insurance, so the consumption smoothing benefits of the ACA could confer a sizable benefit even in the absence of discernable short-run health effects. Hu et al. (2016) found evidence that the ACA's Medicaid expansion improved financial outcomes from credit report data. On the other hand, Pauly (2017) questions whether or not the poor should be allowed to purchase high-deductible marketplace plans. The ACA also contains a number of other components unrelated to insurance coverage, such as provider payment reforms and tax

[20] For instance, 7.7 percent of non-elderly adults directly purchased individual coverage prior to the 2014 reforms (author's calculations using the ACS). For these individuals, the ACA's premium tax credit could directly substitute for household income devoted to health insurance. While many of these people likely experienced positive income shocks, some may have been spending less on insurance prior to the ACA, perhaps because they were purchasing non-comprehensive policies (Clemans-Cope and Anderson, 2014). Thus, it is possible that the share of their budget spent on health insurance could have increased even in the presence of the subsidies.

increases, that each represent a part of the overall picture. Thus both the size and scope of the ACA have generated the need for a great deal of future research in order to better understand the multi-faceted nature of its impacts.

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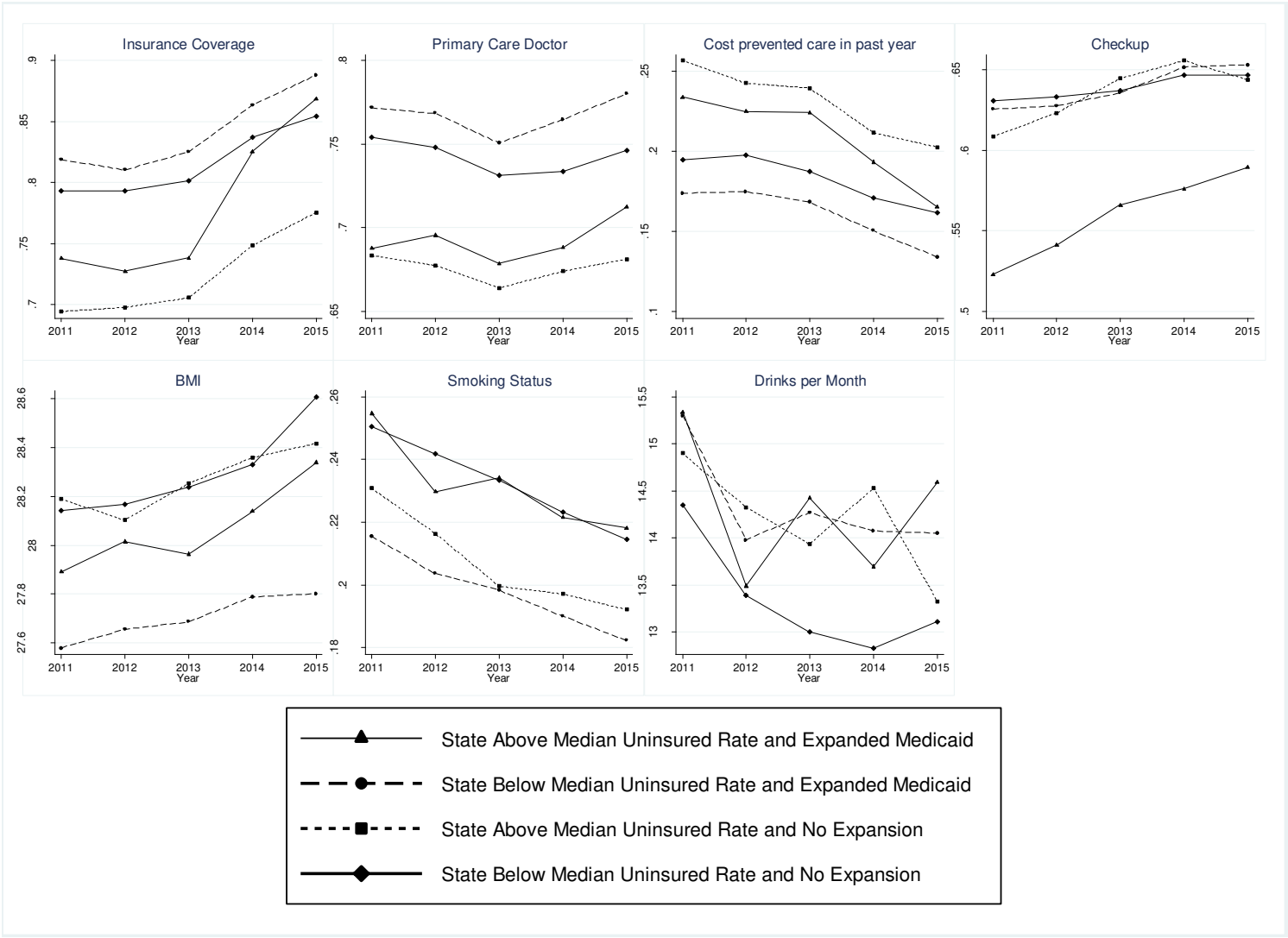
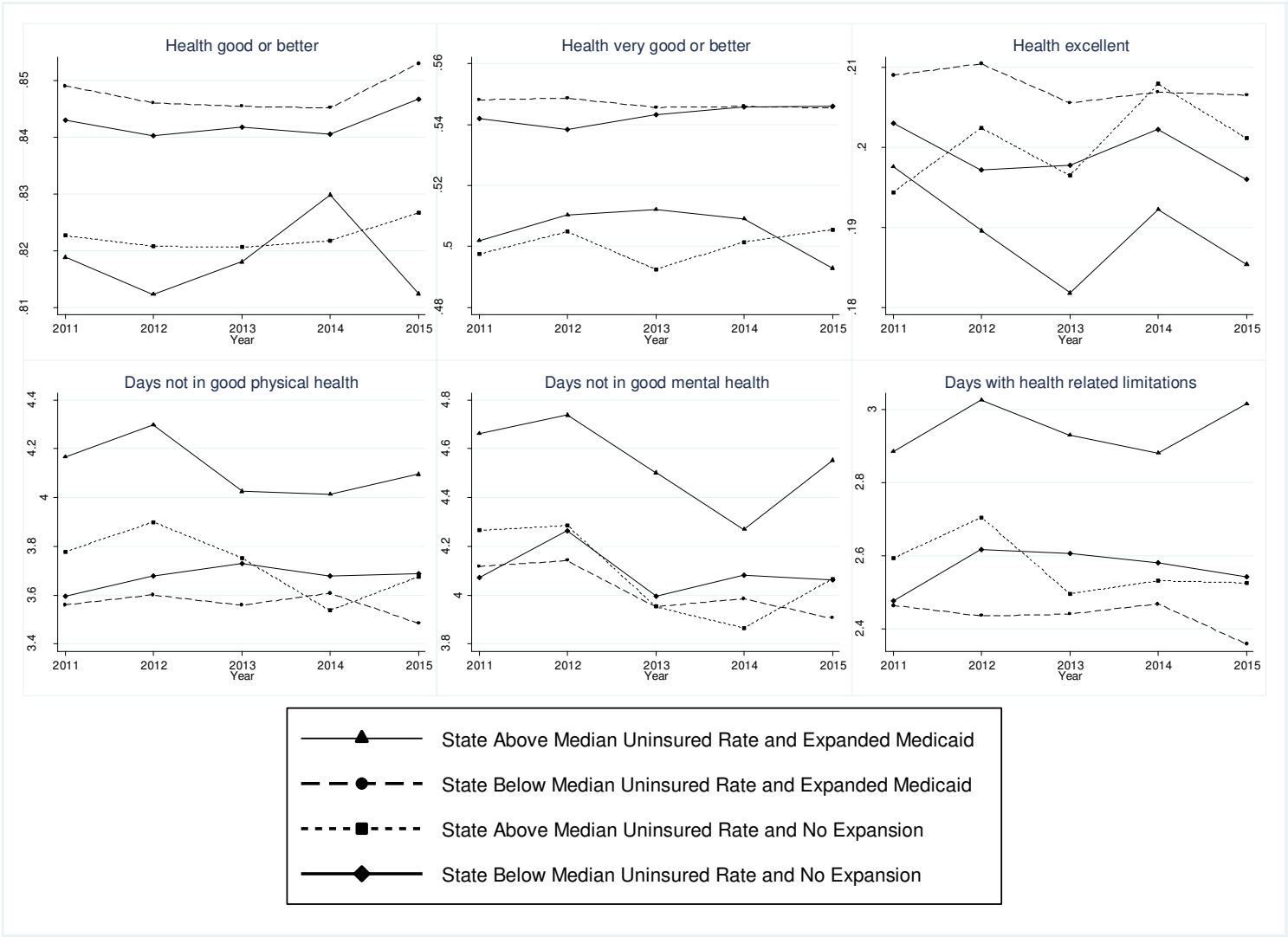
Figures 1 – Changes in Health Care Access and Health Behaviors Over Time By State Medicaid Expansion Status and Pre-Treatment Uninsured Rate



Figures 2 – Changes in Self-Assessed Health Variables Over Time By State Medicaid Expansion Status and Pre-Treatment Uninsured Rate



Figures 3 – ACA Effects on Access and Risky Health Behaviors at Pre-Treatment Uninsured Rates

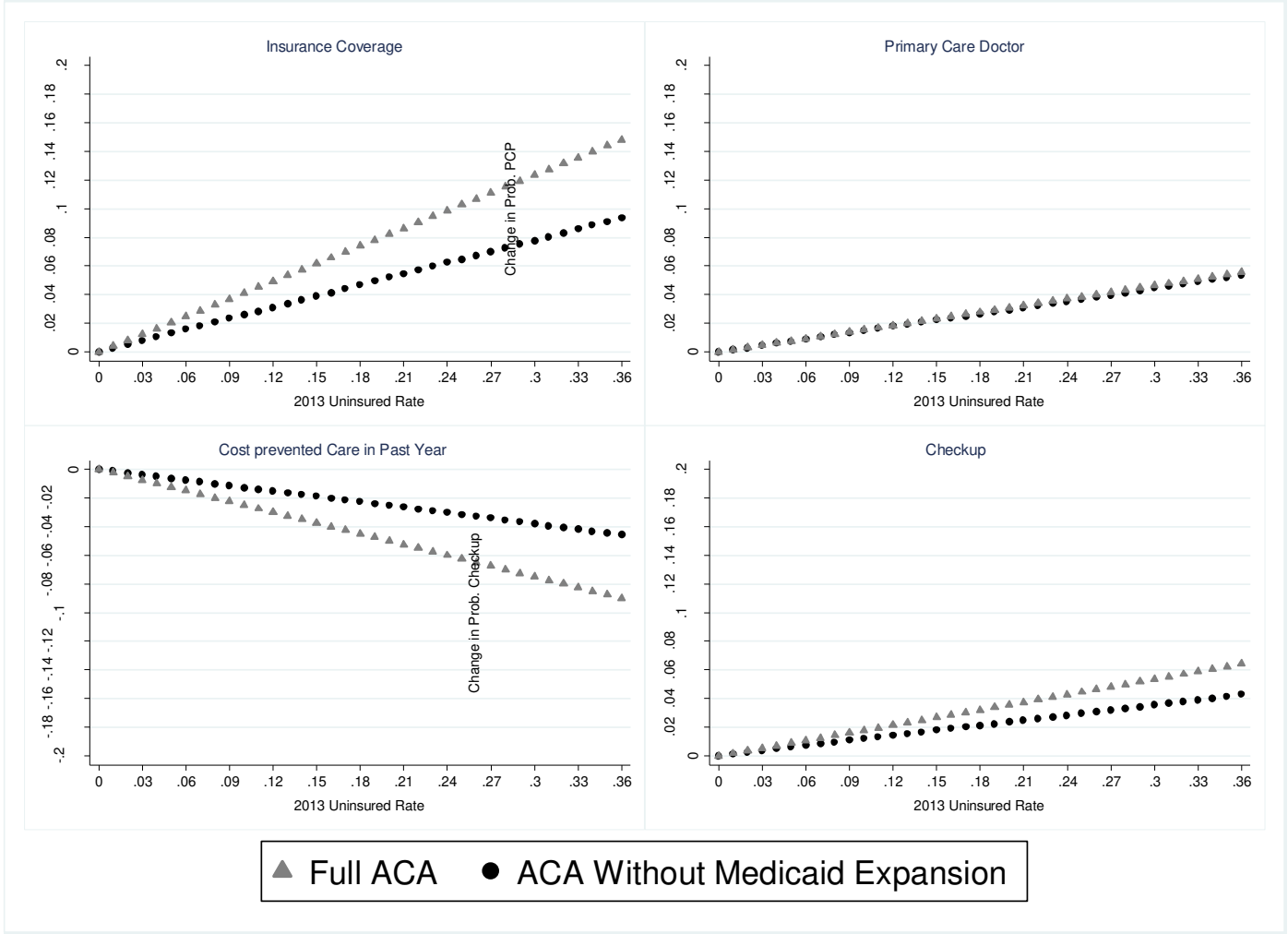


Table 1 – Means and Standard Deviations of Dependent Variables By State Medicaid Expansion Status and Pre-Treatment Uninsured Rate

	Full Sample	Medicaid Expansion; ≥ Median Baseline Uninsured	Medicaid Expansion; < Median Baseline Uninsured	Non-Expansion; ≥ Median Baseline Uninsured	Non-Expansion; < Median Baseline Uninsured
Any Insurance Coverage	0.788	0.791	0.868	0.710	0.805
	(0.409)	(0.407)	(0.339)	(0.454)	(0.396)
Primary Care Doctor	0.741	0.745	0.826	0.682	0.754
	(0.439)	(0.436)	(0.378)	(0.465)	(0.431)
Cost Barrier to Care in Past Year	0.192	0.202	0.144	0.241	0.187
	(0.394)	(0.401)	(0.351)	(0.427)	(0.389)
Well-Patient Doctor Visit in Past Year	0.627	0.586	0.673	0.632	0.629
	(0.484)	(0.492)	(0.469)	(0.482)	(0.483)
Overall Health Good or Better	0.840	0.810	0.851	0.824	0.864
	(0.367)	(0.392)	(0.356)	(0.381)	(0.363)
Overall Health Very Good or Better	0.535	0.511	0.565	0.505	0.544
	(0.499)	(0.499)	(0.496)	(0.499)	(0.498)
Overall Health Excellent	0.204	0.192	0.211	0.199	0.198
	(0.403)	(0.393)	(0.408)	(0.399)	(0.398)
Days Not in Good Physical Health in Past Month	3.660	4.489	3.940	4.149	4.099
	(7.964)	(8.639)	(8.073)	(8.362)	(8.326)
Days Not in Good Mental Health in Past Month	4.118	4.486	3.758	3.755	3.678
	(8.210)	(8.960)	(8.127)	(8.154)	(8.095)
Days with Health-Related Limitations in Past Month	2.518	3.066	2.553	2.572	2.570
	(6.797)	(7.505)	(6.877)	(6.463)	(6.975)
BMI	27.875	28.002	27.848	28.202	28.187
	(6.282)	(6.331)	(6.208)	(6.462)	(6.435)
Smoking Status	0.216	0.212	0.195	0.218	0.244
	(0.412)	(0.408)	(0.396)	(0.420)	(0.429)
Drinks per Month	14.285	13.080	13.782	14.103	13.740
	(35.824)	(32.600)	(32.187)	(37.640)	(35.173)

Note: Standard deviations in parentheses.

Table 2 – Effects of ACA on Health Care Access and Health Behaviors

	Insurance Coverage	Primary Care Doctor	Cost Barrier	Checkup	BMI	Smoker	Alcoholic Drinks per Month
Coefficient Estimates of Interest							
Medicaid Expansion * Post	-0.013	0.005	0.019	0.005	0.003	-0.022*	0.087
	(0.008)	(0.011)	(0.010)	(0.016)	(0.113)	(0.009)	(0.538)
Post * Pre-Treatment Uninsured	0.259***	0.148**	-0.127***	0.119*	-0.087	-0.0006	3.290
	(0.030)	(0.049)	(0.031)	(0.051)	(0.405)	(0.046)	(2.119)
Medicaid Expansion * Post * Pre-Treatment Uninsured	0.152**	0.007	-0.123**	0.060	-0.040	0.054	-0.607
	(0.045)	(0.065)	(0.042)	(0.067)	(0.528)	(0.045)	(2.397)
Implied Effects of ACA at Mean Pre-Treatment Uninsured Rate							
ACA without Medicaid Expansion	0.053***	0.030**	-0.026***	0.024*	-0.018	-0.0001	0.667
	(0.006)	(0.010)	(0.006)	(0.010)	(0.082)	(0.009)	(0.429)
Medicaid Expansion	0.031***	0.001	-0.025**	0.012	-0.008	0.010	-0.123
	(0.009)	(0.013)	(0.009)	(0.014)	(0.107)	(0.009)	(0.486)
Full ACA (with Medicaid Expansion)	0.083***	0.031**	-0.051***	0.036***	-0.026	0.011	0.544
	(0.010)	(0.011)	(0.010)	(0.009)	(0.094)	(0.007)	(0.571)
Pre-Treatment Mean and Standard Deviation of Outcome	0.811	0.742	0.183	0.635	27.951	0.208	14.285
	(0.391)	(0.437)	(0.386)	(0.481)	(6.375)	(0.406)	(35.824)
Sample Size	1,322,370	1,321,567	1,071,238	1,072,537	1,264,243	1,300,819	1,225,053

Notes: Standard errors, heteroscedasticity-robust and clustered by state, are in parentheses. *** indicates statistically significant at 0.1% level; ** 1% level; * 5% level. BRFSS sampling weights are used. All regressions include state*location type and year*location type fixed effects as well as the controls.

Table 3 – Effects of ACA on Self-Assessed Health

	Good or Better Health	Very Good or Better Health	Excellent Health	Days Not in Good Physical Health	Days Not in Good Mental Health	Days with Health-Related Limitations	Health Index
Coefficient Estimates of Interest							
Medicaid Expansion * Post	-0.005	0.009	0.004	-0.171	0.006	-0.334*	0.031
	(0.006)	(0.008)	(0.008)	(0.111)	(0.210)	(0.165)	(0.021)
Post * Pre-Treatment Uninsured	-0.043	0.028	0.038	-0.584	-0.396	-0.595	-0.003
	(0.023)	(0.0327)	(0.025)	(0.555)	(0.763)	(0.695)	(0.096)
Medicaid Expansion * Post * Pre-Treatment Uninsured	0.028	-0.036	0.014	0.336	-0.337	1.114	-0.070
	(0.030)	(0.041)	(0.033)	(0.537)	(0.878)	(0.811)	(0.104)
Implied Effects of ACA at Mean Pre-Treatment Uninsured Rate							
ACA without Medicaid Expansion	-0.009	0.006	0.008	-0.118	-0.080	-0.121	-0.006
	(0.005)	(0.006)	(0.005)	(0.112)	(0.155)	(0.141)	(0.020)
Medicaid Expansion	0.006	-0.007	-0.003	0.068	-0.068	0.226	-0.014
	(0.006)	(0.008)	(0.007)	(0.108)	(0.178)	(0.164)	(0.021)
Full ACA (with Medicaid Expansion)	-0.003	-0.002	0.005	-0.050	-0.149	0.105	-0.015
	(0.006)	(0.010)	(0.006)	(0.126)	(0.126)	(0.154)	(0.016)
Pre-Treatment Mean and Standard Deviation	0.841	0.537	0.204	3.634	4.071	2.500	-0.036
	(0.366)	(0.499)	(0.403)	(7.948)	(8.169)	(6.777)	(0.987)
Sample Size	1,321,799	1,321,799	1,321,799	1,309,624	1,310,641	1,316,271	1,324,849

See notes for Table 2.

Table 4 – Instrumental Variables Estimates of the Effect of Health Insurance on Health Care Access Outcomes

	Primary Care Doctor	Cost Barrier	Checkup
Any Insurance	0.446***	-0.469***	0.357***
	(0.080)	(0.075)	(0.092)
Sample Size	1,319,215	1,069,336	1,070,619
First-Stage F Statistic	618.16	704.79	703.35
Overidentification Test P-Value	0.001	0.144	0.721

See notes for Table 2.

Table 5 – Event Study Regressions for Health Care Access and Health Behaviors

	Insurance Coverage	Primary Care Doctor	Cost Barrier	Checkup	BMI	Smoker	Drinks per Month
Coefficient Estimates of Interest (2013 is base year)							
2011 * Pre-Treatment Uninsured	0.018	-0.057	0.094	-0.296***	0.602	0.035	-5.326
	(0.069)	(0.059)	(0.060)	(0.087)	(0.723)	(0.043)	(3.366)
2012 * Pre-Treatment Uninsured	-0.052	-0.022	-0.011	-0.173*	-0.950	0.022	0.926
	(0.067)	(0.081)	(0.056)	(0.066)	(0.622)	(0.046)	(4.642)
2014 * Pre-Treatment Uninsured	0.193***	0.115**	-0.129**	-0.0143	-0.435	0.010	8.360*
	(0.046)	(0.045)	(0.054)	(0.050)	(0.723)	(0.050)	(3.968)
2015 * Pre-Treatment Uninsured	0.310***	0.140	-0.106**	-0.021	-0.623	0.041	-3.211
	(0.066)	(0.117)	(0.052)	(0.088)	(0.614)	(0.041)	(3.336)
Medicaid Expansion * 2011 * Pre-Treatment Uninsured	0.027	0.054	-0.047	0.096	-0.167	-0.046	0.462
	(0.075)	(0.074)	(0.045)	(0.081)	(0.834)	(0.048)	(5.479)
Medicaid Expansion * 2012 * Pre-Treatment Uninsured	-0.001	0.113	-0.006	0.039	1.552	-0.094	-10.885
	(0.106)	(0.103)	(0.047)	(0.053)	(0.809)	(0.052)	(5.856)
Medicaid Expansion * 2014 * Pre-Treatment Uninsured	0.134*	0.011	-0.005	0.046	-0.391	0.019	-8.835*
	(0.062)	(0.074)	(0.050)	(0.060)	(0.916)	(0.050)	(4.117)
Medicaid Expansion * 2015 * Pre-Treatment Uninsured	0.197*	0.083	-0.142**	0.100	1.171	-0.024	-0.428
	(0.082)	(0.115)	(0.048)	(0.077)	(0.793)	(0.042)	(3.684)
Implied Effects of ACA at Mean Pre-Treatment Uninsured Rate							
ACA without Medicaid Expansion in 2014	0.039***	0.023**	-0.026*	-0.003	-0.088	0.002	1.695*
	(0.009)	(0.009)	(0.001)	(0.010)	(0.146)	(0.010)	(0.805)
ACA without Medicaid Expansion in 2015	0.063***	0.028	-0.022*	-0.004	-0.126	0.008	-0.651
	(0.013)	(0.024)	(0.010)	(0.018)	(0.124)	(0.008)	(0.677)
Full ACA (with Medicaid Expansion) in 2014	0.066***	0.026	-0.027***	0.006	-0.009	0.006	-0.096
	(0.012)	(0.015)	(0.008)	(0.013)	(0.128)	(0.011)	(0.752)
Full ACA (with Medicaid Expansion) in 2015	0.103***	0.045**	-0.050***	0.016	0.111	0.004	-0.564
	(0.013)	(0.014)	(0.012)	(0.010)	(0.182)	(0.007)	(0.845)

See notes from Table 2.

Table 6 – Event Study Regressions for Self-Assessed Health

	Good or Better Health	Very Good or Better Health	Excell-ent Health	Days Not in Good Physical Health	Days Not in Good Mental Health	Days with Health-Related Limitations	Health Index
Coefficient Estimates of Interest (2013 is base year)							
2011 * Pre-Treatment Uninsured	0.047	-0.062	-0.056	0.922	1.492	1.056	-0.105
	(0.048)	(0.047)	(0.055)	(1.606)	(1.191)	(0.687)	(0.166)
2012 * Pre-Treatment Uninsured	0.025	0.134	0.059	1.477	1.120	1.375*	-0.009
	(0.062)	(0.076)	(0.044)	(1.664)	(0.769)	(0.650)	(0.157)
2014 * Pre-Treatment Uninsured	-0.039	0.080*	0.061	-.515	-0.213	-0.292	0.039
	(0.038)	(0.033)	(0.042)	(1.142)	(0.836)	(0.625)	(0.091)
2015 * Pre-Treatment Uninsured	-0.007	0.088	0.044	0.358	1.300	0.370	-0.098
	(0.031)	(0.072)	(0.041)	(0.907)	(0.649)	(0.761)	(0.074)
Medicaid Expansion * 2011 * Pre-Treatment Uninsured	-0.048	0.007	0.124	-1.221	-0.686	-1.093	0.167
	(0.057)	(0.070)	(0.69)	(1.457)	(1.309)	(0.735)	(0.155)
Medicaid Expansion * 2012 * Pre-Treatment Uninsured	-0.062	-0.087	0.002	0.447	-0.794	-0.361	0.009
	(0.068)	(0.089)	(0.061)	(1.383)	(0.846)	(0.552)	(0.016)
Medicaid Expansion * 2014 * Pre-Treatment Uninsured	0.028	-0.081	0.045	0.715	-1.344	0.599	-0.046
	(0.043)	(0.059)	(0.051)	(1.236)	(0.774)	(0.997)	(0.125)
Medicaid Expansion * 2015 * Pre-Treatment Uninsured	-0.025	-0.066	0.049	-0.072	-0.855	0.873	0.003
	(0.052)	(0.092)	(0.054)	(1.062)	(1.019)	(0.847)	(0.094)
Implied Effects of ACA at Mean Pre-Treatment Uninsured Rate							
ACA without Medicaid Expansion in 2014	-0.008	0.016*	0.013	-0.105	-0.043	-0.059	0.008
	(0.008)	(0.007)	(0.009)	(0.232)	(0.170)	(0.127)	(0.019)
ACA without Medicaid Expansion in 2015	-0.001	0.018	0.009	0.073	0.263	0.075	-0.019
	(0.006)	(0.015)	(0.008)	(0.184)	(0.132)	(0.154)	(0.015)
Full ACA (with Medicaid Expansion) in 2014	-0.002	-0.0002	0.003	0.040	-0.316*	0.063	-0.002
	(0.009)	(0.011)	(0.008)	(0.176)	(0.134)	(0.199)	(0.020)
Full ACA (with Medicaid Expansion) in 2015	-0.006	0.004	0.019*	0.058	0.090	0.252	-0.019
	(0.009)	(0.014)	(0.009)	(0.175)	(0.150)	(0.168)	(0.019)

See notes from Table 2.

Table 7 – Income Below Median Subsample

(Pre-Treatment Uninsured Rate = 0.316)

	Insurance Coverage	Primary Care Doctor	Cost Barrier	Checkup	BMI	Smoker	Drinks per Month
ACA w/o Medicaid	0.052**	0.041**	-0.016	0.046*	-0.006	-0.005	1.728*
	(0.017)	(0.013)	(0.009)	(0.018)	(0.153)	(0.012)	(0.693)
Medicaid Expansion	0.067**	-0.002	-0.044*	-0.010	-0.091	0.019	-1.399*
	(0.026)	(0.021)	(0.017)	(0.023)	(0.209)	(0.014)	(0.643)
Full ACA (w/ Medicaid)	0.119***	0.038*	-0.060**	0.035	-0.098	0.013	0.330
	(0.019)	(0.017)	(0.019)	(0.018)	(0.165)	(0.010)	(0.816)
Pre-Treatment Mean and Standard Deviation	0.674	0.664	0.289	0.581	28.344	0.276	12.508
	(0.469)	(0.472)	(0.453)	(0.493)	(6.766)	(0.447)	(37.676)
Sample Size	672,937	672,627	548,521	549,596	638,395	660,975	640,349

	Good or Better Health	Very Good or Better Health	Excellent Health	Days Not in Good Physical Health	Days Not in Good Mental Health	Days with Health-Related Limitations	Health Index
ACA w/o Medicaid	-0.004	0.012	0.012**	-0.316	-0.300	-0.388	0.026
	(0.008)	(0.011)	(0.004)	(0.159)	(0.243)	(0.247)	(0.026)
Medicaid Expansion	0.005	-0.002	0.004	0.187	-0.233	0.504	-0.014
	(0.012)	(0.015)	(0.012)	(0.245)	(0.300)	(0.360)	(0.037)
Full ACA (w/ Medicaid)	0.001	0.009	0.016	-0.129	-0.533*	0.116	0.012
	(0.012)	(0.016)	(0.012)	(0.232)	(0.233)	(0.282)	(0.029)
Pre-Treatment Mean and Standard Deviation	0.768	0.426	0.155	4.798	5.276	3.482	-0.249
	(0.422)	(0.495)	(0.362)	(9.052)	(9.262)	(7.969)	(1.077)
Sample Size	672,765	672,765	672,765	663,572	664,825	668,102	674,849

See notes from Table 2.

Table 8 – Income Above Median Subsample

(Pre-Treatment Uninsured Rate = 0.062)

	Insurance Coverage	Primary Care Doctor	Cost Barrier	Checkup	BMI	Smoker	Drinks per Month
ACA w/o Medicaid	0.026***	0.010	-0.003	-0.006	-0.019	0.005	-0.335
	(0.006)	(0.007)	(0.005)	(0.012)	(0.061)	(0.005)	(0.340)
Medicaid Expansion	-0.007	-0.006	-0.004	0.010	0.084	0.015**	0.863
	(0.006)	(0.008)	(0.008)	(0.017)	(0.101)	(0.005)	(0.452)
Full ACA (w/ Medicaid)	0.020***	0.005	-0.007	0.004	0.065	0.020**	0.528
	(0.006)	(0.006)	(0.008)	(0.012)	(0.110)	(0.007)	(0.509)
Pre-Treatment Mean and Standard Deviation	0.933	0.837	0.070	0.684	27.289	0.141	16.474
	(0.249)	(0.369)	(0.255)	(0.465)	(5.580)	(0.348)	(33.297)
Sample Size	649,433	648,940	522,717	522,941	625,848	639,844	627,768

	Good or Better Health	Very Good or Better Health	Excellent Health	Days Not in Good Physical Health	Days Not in Good Mental Health	Days with Health-Related Limitations	Health Index
ACA w/o Medicaid	-0.006	0.002	0.006	-0.064	0.095	-0.017	-0.010
	(0.004)	(0.006)	(0.008)	(0.071)	(0.093)	(0.057)	(0.011)
Medicaid Expansion	0.003	-0.009	0.004	0.048	0.112	0.046	-0.022
	(0.005)	(0.008)	(0.009)	(0.111)	(0.137)	(0.084)	(0.013)
Full ACA (w/ Medicaid)	-0.003	-0.007	0.010	-0.017	0.207	0.029	-0.032*
	(0.004)	(0.008)	(0.009)	(0.111)	(0.115)	(0.085)	(0.013)
Pre-Treatment Mean and Standard Deviation	0.931	0.675	0.266	2.214	2.651	1.283	0.234
	(0.254)	(0.468)	(0.442)	(6.000)	(6.330)	(4.605)	(0.778)
Sample Size	649,034	649,034	649,034	646,052	643,712	648,169	650,000

See notes from Table 2.

Table 9 – Non-College Graduate Subsample

(Pre-Treatment Uninsured Rate = 0.253)

	Insurance Coverage	Primary Care Doctor	Cost Barrier	Checkup	BMI	Smoker	Drinks per Month
ACA w/o Medicaid	0.059***	0.030*	-0.025*	0.031*	-0.021	-0.003	1.053
	(0.007)	(0.013)	(0.011)	(0.013)	(0.107)	(0.011)	(0.606)
Medicaid Expansion	0.040***	0.001	-0.036*	0.010	0.067	0.013	-0.559
	(0.013)	(0.017)	(0.015)	(0.016)	(0.152)	(0.012)	(0.762)
Full ACA (w/ Medicaid)	0.100***	0.032*	-0.062***	0.040***	0.046	0.010	0.494
	(0.014)	(0.013)	(0.015)	(0.011)	(0.120)	(0.010)	(0.803)
Pre-Treatment Mean and Standard Deviation	0.736	0.708	0.230	0.610	28.332	0.266	14.397
	(0.441)	(0.455)	(0.421)	(0.488)	(6.516)	(0.442)	(38.966)
Sample Size	805,370	804,971	654,250	655,238	767,571	791,481	767,463

	Good or Better Health	Very Good or Better Health	Excellent Health	Days Not in Good Physical Health	Days Not in Good Mental Health	Days with Health-Related Limitations	Health Index
ACA w/o Medicaid	-0.010	0.014	0.018***	-0.231	-0.060	-0.154	0.007
	(0.006)	(0.007)	(0.005)	(0.145)	(0.204)	(0.192)	(0.023)
Medicaid Expansion	0.010	-0.011	-0.008	0.127	-0.176	0.299	-0.017
	(0.009)	(0.012)	(0.007)	(0.156)	(0.261)	(0.260)	(0.028)
Full ACA (w/ Medicaid)	-0.000	0.003	0.010	-0.104	-0.236	0.146	-0.010
	(0.009)	(0.014)	(0.008)	(0.161)	(0.175)	(0.239)	(0.021)
Pre-Treatment Mean and Standard Deviation	0.802	0.393	0.168	4.254	4.682	2.967	-0.176
	(0.398)	(0.488)	(0.373)	(8.592)	(8.787)	(7.396)	(1.029)
Sample Size	805,178	805,178	805,178	795,368	796,668	800,482	807,390

See notes from Table 2.

Table 10 – College Graduate Subsample
(Pre-Treatment Uninsured Rate = 0.075)

	Insurance Coverage	Primary Care Doctor	Cost Barrier	Checkup	BMI	Smoker	Drinks per Month
ACA w/o Medicaid	0.021***	0.017**	-0.010*	0.007	-0.013	0.007	-0.157
	(0.003)	(0.006)	(0.005)	(0.008)	(0.100)	(0.005)	(0.438)
Medicaid Expansion	0.005	-0.007	-0.006	0.015	-0.181	0.002	0.870*
	(0.003)	(0.007)	(0.007)	(0.016)	(0.116)	(0.005)	(0.380)
Full ACA (w/ Medicaid)	0.027***	0.011	-0.016*	0.022	-0.194	0.008	0.713
	(0.004)	(0.006)	(0.007)	(0.014)	(0.144)	(0.004)	(0.409)
Pre-Treatment Mean and Standard Deviation	0.922	0.791	0.096	0.669	26.709	0.087	14.005
	(0.268)	(0.406)	(0.294)	(0.471)	(5.492)	(0.283)	(26.468)
Sample Size	517,000	516,596	416,988	417,299	496,672	509,338	500,654

	Good or Better Health	Very Good or Better Health	Excellent Health	Days Not in Good Physical Health	Days Not in Good Mental Health	Days with Health-Related Limitations	Health Index
ACA w/o Medicaid	0.003	-0.002	-0.013	0.067	-0.152	-0.099	-0.002
	(0.003)	(0.006)	(0.010)	(0.083)	(0.094)	(0.054)	(0.100)
Medicaid Expansion	-0.002	-0.008	0.013	0.013	0.196	0.201*	-0.013
	(0.004)	(0.008)	(0.011)	(0.139)	(0.142)	(0.093)	(0.016)
Full ACA (w/ Medicaid)	0.001	-0.010	-0.0003	0.080	0.044	0.102	-0.015
	(0.003)	(0.009)	(0.008)	(0.145)	(0.161)	(0.092)	(0.017)
Pre-Treatment Mean and Standard Deviation	0.938	0.709	0.296	2.118	2.660	1.912	0.325
	(0.242)	(0.454)	(0.457)	(5.736)	(6.233)	(5.776)	(0.754)
Sample Size	516,621	516,621	516,621	514,256	513,953	515,789	517,459

See notes from Table 2.

Table 11 – Age Below Median Subsample

(Pre-Treatment Uninsured Rate = 0.233)

	Insurance Coverage	Primary Care Doctor	Cost Barrier	Checkup	BMI	Smoker	Drinks per Month
ACA w/o Medicaid	0.056***	0.022*	-0.033**	0.021	-0.032	-0.001	0.882
	(0.006)	(0.010)	(0.011)	(0.011)	(0.098)	(0.012)	(0.591)
Medicaid Expansion	0.029*	0.005	-0.022	0.019	0.009	0.018	-0.326
	(0.012)	(0.014)	(0.015)	(0.015)	(0.149)	(0.013)	(0.656)
Full ACA (w/ Medicaid)	0.085***	0.027*	-0.055***	0.040***	-0.024	0.017	0.556
	(0.013)	(0.012)	(0.014)	(0.011)	(0.129)	(0.009)	(0.747)
Pre-Treatment Mean and Standard Deviation	0.757	0.675	0.208	0.577	27.449	0.225	15.194
	(0.429)	(0.468)	(0.406)	(0.494)	(6.273)	(0.417)	(37.965)
Sample Size	652,429	652,082	531,312	531,987	618,804	640,852	622,490

	Good or Better Health	Very Good or Better Health	Excellent Health	Days Not in Good Physical Health	Days Not in Good Mental Health	Days with Health-Related Limitations	Health Index
ACA w/o Medicaid	-0.003	0.003	0.004	-0.285	-0.075	-0.240	0.014
	(0.007)	(0.006)	(0.007)	(0.216)	(0.225)	(0.200)	(0.033)
Medicaid Expansion	-0.001	-0.010	-0.004	0.283	-0.113	0.333	-0.037
	(0.009)	(0.010)	(0.011)	(0.184)	(0.280)	(0.236)	(0.033)
Full ACA (w/ Medicaid)	-0.004	-0.007	0.001	-0.002	-0.188	0.093	-0.023
	(0.008)	(0.010)	(0.009)	(0.149)	(0.189)	(0.195)	(0.019)
Pre-Treatment Mean and Standard Deviation	0.874	0.571	0.226	2.943	4.130	2.061	0.012
	(0.332)	(0.495)	(0.418)	(6.921)	(8.042)	(5.958)	(0.929)
Sample Size	652,707	652,707	652,707	647,944	647,941	650,873	670,911

See notes from Table 2.

Table 12 – Age Above Median Subsample

(Pre-Treatment Uninsured Rate = 0.149)

	Insurance Coverage	Primary Care Doctor	Cost Barrier	Checkup	BMI	Smoker	Drinks per Month
ACA w/o Medicaid	0.037***	0.036*	-0.002	0.037*	-0.098	-0.004	0.396
	(0.010)	(0.015)	(0.008)	(0.015)	(0.122)	(0.006)	(0.602)
Medicaid Expansion	0.036**	0.002	-0.036**	0.004	0.120	-0.003	0.585
	(0.011)	(0.015)	(0.012)	(0.019)	(0.182)	(0.006)	(0.767)
Full ACA (w/ Medicaid)	0.072***	0.038**	-0.038***	0.042***	0.022	-0.007	0.981
	(0.008)	(0.012)	(0.010)	(0.012)	(0.135)	(0.006)	(0.724)
Pre-Treatment Mean and Standard Deviation	0.847	0.861	0.162	0.717	28.635	0.200	12.640
	(0.360)	(0.346)	(0.368)	(0.450)	(6.235)	(0.400)	(31.553)
Sample Size	669,941	669,485	539,926	540,550	645,439	659,967	645,627

	Good or Better Health	Very Good or Better Health	Excellent Health	Days Not in Good Physical Health	Days Not in Good Mental Health	Days with Health-Related Limitations	Health Index
ACA w/o Medicaid	-0.009	0.016*	0.012**	-0.045	-0.117	-0.098	0.004
	(0.005)	(0.006)	(0.004)	(0.157)	(0.127)	(0.101)	(0.011)
Medicaid Expansion	0.011	-0.019*	-0.008	-0.295	-0.234	-0.194	0.028*
	(0.008)	(0.007)	(0.007)	(0.179)	(0.137)	(0.118)	(0.013)
Full ACA (w/ Medicaid)	0.002	-0.003	0.004	-0.340*	-0.351*	-0.292*	0.032*
	(0.008)	(0.008)	(0.008)	(0.147)	(0.142)	(0.123)	(0.013)
Pre-Treatment Mean and Standard Deviation	0.779	0.472	0.163	4.956	4.077	3.333	-0.124
	(0.415)	(0.499)	(0.369)	(9.423)	(8.479)	(8.013)	(1.080)
Sample Size	669,092	669,092	669,092	661,680	662,700	665,398	653,938

See notes from Table 2.

Appendix Table A1 – Summary Statistics for Control Variables By State Medicaid Expansion Status and Pre-Treatment Uninsured Rate

	Full Sample	Medicaid Expansion; ≥ Median Baseline Uninsured	Medicaid Expansion; < Median Baseline Uninsured	Non-Expansion; ≥ Median Baseline Uninsured	Non-Expansion; < Median Baseline Uninsured
Age 25-29	0.105	0.107	0.104	0.107	0.105
	(0.306)	(0.308)	(0.303)	(0.300)	(0.307)
Age 30-34	0.118	0.121	0.117	0.120	0.118
	(0.323)	(0.325)	(0.320)	(0.317)	(0.322)
Age 35-39	0.107	0.106	0.102	0.103	0.099
	(0.302)	(0.306)	(0.299)	(0.296)	(0.302)
Age 40-44	0.119	0.114	0.118	0.124	0.116
	(0.323)	(0.320)	(0.320)	(0.318)	(0.320)
Age 45-49	0.108	0.103	0.108	0.108	0.106
	(0.309)	(0.304)	(0.305)	(0.306)	(0.303)
Age 50-54	0.130	0.127	0.131	0.129	0.131
	(0.336)	(0.332)	(0.333)	(0.337)	(0.329)
Age 55-59	0.104	0.105	0.106	0.098	0.104
	(0.304)	(0.306)	(0.302)	(0.308)	(0.297)
Age 60-64	0.096	0.103	0.096	0.095	0.098
	(0.294)	(0.299)	(0.293)	(0.295)	(0.292)
Female	0.497	0.491	0.497	0.499	0.498
	(0.499)	(0.499)	(0.499)	(0.499)	(0.499)
Black	0.122	0.066	0.096	0.188	0.134
	(0.327)	(0.235)	(0.332)	(0.312)	(0.341)
Hispanic	0.166	0.198	0.172	0.221	0.059
	(0.372)	(0.385)	(0.370)	(0.300)	(0.424)
White	0.633	0.651	0.636	0.542	0.750
	(0.482)	(0.463)	(0.482)	(451)	(0.497)
Married	0.524	0.521	0.518	0.20	0.553
	(0.499)	(0.499)	(0.499)	(0.499)	(0.499)
High school degree	0.267	0.278	0.259	0.274	0.289
	(0.443)	(0.451)	(0.446)	(0.447)	(0.443)
Some College	0.320	0.347	0.315	0.319	0.331
	(0.466)	(0.473)	(0.465)	(0.463)	(0.466)
College graduate	0.281	0.236	0.298	0.254	0.272
	(0.449)	(0.422)	(0.445)	(0.459)	(0.432)

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Appendix Table A1 – Continued

	Full Sample	Medicaid Expansion; ≥ Median Baseline Uninsured	Medicaid Expansion; < Median Baseline Uninsured	Non-Expansion; ≥ Median Baseline Uninsured	Non-Expansion; < Median Baseline Uninsured
No child	0.544	0.553	0.544	0.533	0.555
	(0.498)	(0.497)	(0.498)	(0.497)	(0.498)
One child	0.181	0.175	0.182	0.185	0.177
	(0.385)	(0.382)	(0.387)	(0.384)	(0.390)
Two children	0.166	0.166	0.168	0.167	0.160
	(0.372)	(0.366)	(0.371)	(0.370)	(0.372)
Three children	0.072	0.070	0.071	0.075	0.069
	(0.257)	(0.257)	(0.258)	(0.252)	(0.262)
Four children	0.025	0.025	0.024	0.028	0.026
	(0.156)	(0.158)	(0.155)	(0.148)	(0.160)
Unemployed	0.091	0.102	0.093	0.092	0.078
	(0.280)	(0.290)	(0.283)	(0.270)	(0.289)
Unemployment rate	8.053	8.716	8.421	7.880	6.829
	(1.628)	(1.362)	(1.745)	(1.525)	(1.499)
Student	0.051	0.051	0.055	0.048	0.045
	(0.221)	(0.213)	(0.239)	(0.240)	(0.241)
Income 10k to less than 15k	0.058	0.067	0.056	0.067	0.055
	(0.235)	(0.231)	(0.233)	(0.209)	(0.253)
Income 15k to less than 20k	0.080	0.095	0.072	0.098	0.081
	(0.271)	(0.261)	(0.273)	(0.255)	(0.285)
Income 20k to less than 25k	0.089	0.110	0.081	0.103	0.098
	(0.286)	(0.274)	(0.287)	(0.276)	(0.294)
Income 25k to less than 35k	0.103	0.120	0.097	0.112	0.109
	(0.304)	(0.294)	(0.304)	(0.294)	(0.310)
Income 35k to less than 50k	0.134	0.141	0.129	0.136	0.148
	(0.340)	(0.329)	(0.341)	(0.341)	(0.337)
Income 50k to less than 75k	0.154	0.151	0.156	0.139	0.165
	(0.360)	(0.351)	(0.359)	(0.369)	(0.346)
Income more than 75k	0.309	0.242	0.337	0.268	0.281
	(0.460)	(0.476)	(0.461)	(0.476)	(0.448)

Note: Standard deviations in parentheses.

Appendix Table A2 – Implied Effect of ACA on Probability of Any Insurance at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	0.048***	0.048***	0.052***	0.053***	0.062***	0.052***	0.053***	0.048***
	(0.007)	(0.008)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Medicaid Expansion	0.031**	0.031**	0.028**	0.031***	0.017	0.060***	0.058***	0.066***
	(0.010)	(0.011)	(0.011)	(0.009)	(0.015)	(0.010)	(0.009)	(0.010)
Full ACA (with Medicaid Expansion)	0.079***	0.080***	0.080***	0.083***	0.078***	0.112***	0.111***	0.114***
	(0.009)	(0.010)	(0.010)	(0.010)	(0.014)	(0.010)	(0.010)	(0.010)
Sample Size	1,333,480	1,328,980	1,322,370	1,322,370	852,953	1,322,370	1,322,370	1,322,370

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	0.056***	0.039***	0.056***	0.052***	0.048***	0.049***	0.052***
	(0.008)	(0.005)	(0.006)	(0.007)	(0.005)	(0.005)	(0.006)
Medicaid Expansion	0.034***	0.064***	0.029***	0.034*	0.027*	0.024*	0.033
	(0.009)	(0.013)	(0.008)	(0.015)	(0.010)	(0.009)	(0.009)
Full ACA (with Medicaid Expansion)	0.089***	0.103***	0.086***	0.085***	0.075***	0.073***	0.084***
	(0.009)	(0.011)	(0.008)	(0.015)	(0.011)	(0.010)	(0.010)
Sample Size	1,322,370	1,322,370	1,227,845	746,174	1,129,957	1,207,428	1,274,613

Notes: Standard errors, heteroscedasticity-robust and clustered by state, are in parentheses. *** indicates statistically significant at 0.1% level; ** 1% level; * 5% level. Sampling weights are used.

Appendix Table A3 – Implied Effect of ACA on Probability of having a Primary Care Doctor at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	0.028*	0.028*	0.028**	0.030**	0.012	0.036**	0.037**	0.033**
	(0.011)	(0.011)	(0.010)	(0.010)	(0.009)	(0.012)	(0.012)	(0.012)
Medicaid Expansion	0.003	0.003	-0.001	0.001	0.019	0.006	0.005	0.010
	(0.014)	(0.015)	(0.013)	(0.013)	(0.018)	(0.018)	(0.017)	(0.017)
Full ACA (with Medicaid Expansion)	0.031**	0.031**	0.027*	0.031**	0.031**	0.042**	0.042**	0.043**
	(0.011)	(0.011)	(0.010)	(0.011)	(0.015)	(0.015)	(0.015)	(0.016)
Sample Size	1,332,661	1,328,160	1,321,567	1,321,567	852,446	1,321,567	1,321,567	1,321,567

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	0.035***	0.032**	0.035**	0.032**	0.029*	0.030**	0.029**
	(0.010)	(0.010)	(0.011)	(0.012)	(0.010)	(0.010)	(0.010)
Medicaid Expansion	0.010	0.009	-0.006	0.001	0.008	-0.001	0.003
	(0.015)	(0.022)	(0.014)	(0.015)	(0.015)	(0.013)	(0.013)
Full ACA (with Medicaid Expansion)	0.044**	0.041**	0.029	0.033	0.037*	0.030*	0.031**
	(0.014)	(0.018)	(0.011)	(0.017)	(0.012)	(0.011)	(0.011)
Sample Size	1,321,567	1,321,567	1,226,827	745,735	1,129,281	1,206,714	1,273,853

See notes for Appendix Table A2.

Appendix Table A4– Implied Effect of ACA on Probability of having a Cost Barrier at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	-0.021*	-0.021*	-0.025***	-0.026***	-0.010	-0.031***	0.031***	-0.027***
	(0.009)	(0.008)	(0.006)	(0.006)	(0.011)	(0.008)	(0.008)	(0.007)
Medicaid Expansion	-0.027**	-0.028**	-0.024**	-0.025**	-0.050**	-0.031**	-0.029*	-0.035*
	(0.009)	(0.007)	(0.008)	(0.009)	(0.015)	(0.008)	(0.011)	(0.009)
Full ACA (with Medicaid Expansion)	-0.048***	-0.049***	-0.049***	-0.051***	-0.061***	-0.061***	-0.060***	-0.062***
	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)
Sample Size	1,079,266	1,075,533	1,071,238	1,071,238	715,800	1,071,238	1,071,238	1,071,238

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	-0.030***	-0.018***	-0.023***	-0.020**	-0.024***	-0.025***	-0.026***
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Medicaid Expansion	-0.023	-0.045**	-0.033**	-0.045*	-0.019*	-0.022*	-0.024**
	(0.011)	(0.012)	(0.010)	(0.017)	(0.008)	(0.010)	(0.009)
Full ACA (with Medicaid Expansion)	-0.053***	-0.063***	-0.055***	-0.065**	-0.043***	-0.048***	-0.050***
	(0.011)	(0.011)	(0.010)	(0.020)	(0.010)	(0.012)	(0.011)
Sample Size	1,071,238	1,071,238	994,606	605,156	916,029	976,422	1,031,483

See notes for Appendix Table A2.

Appendix Table A5 – Implied Effect of ACA on Probability of Having a Checkup at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	0.021	0.021	0.024*	0.023*	0.047***	0.011	0.012	0.007
	(0.013)	(0.012)	(0.011)	(0.011)	(0.010)	(0.012)	(0.012)	(0.012)
Medicaid Expansion	0.012	0.013	0.013	0.012	-0.008	0.039*	0.035*	0.042**
	(0.014)	(0.014)	(0.013)	(0.013)	(0.017)	(0.015)	(0.015)	(0.014)
Full ACA (with Medicaid Expansion)	0.033***	0.034***	0.037***	0.035***	0.039*	0.050***	0.047***	0.049***
	(0.008)	(0.008)	(0.009)	(0.009)	(0.015)	(0.011)	(0.012)	(0.012)
Sample Size	1,080,580	1,076,836	1,072,537	1,072,537	716,568	1,072,537	1,072,537	1,072,537

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	0.021	0.014	0.023*	0.013**	0.021*	0.023*	0.024*
	(0.011)	(0.007)	(0.010)	(0.010)	(0.010)	(0.011)	(0.010)
Medicaid Expansion	0.016	0.040*	0.013	0.018	0.012	0.008	0.016
	(0.015)	(0.017)	(0.015)	(0.017)	(0.015)	(0.014)	(0.014)
Full ACA (with Medicaid Expansion)	0.037***	0.054***	0.037***	0.031	0.033**	0.032**	0.040***
	(0.010)	(0.010)	(0.011)	(0.016)	(0.011)	(0.010)	(0.009)
Sample Size	1,072,537	1,072,537	995,814	605,935	917,151	977,617	1,032,729

See notes for Appendix Table A2.

Appendix Table A6 – Implied Effect of ACA on BMI at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	-0.004	-0.023	-0.009	-0.018	0.105	-0.105	0.105	-0.112
	(0.086)	(0.087)	(0.082)	(0.082)	(0.091)	(0.101)	(0.091)	(0.104)
Medicaid Expansion	-0.072	-0.032	-0.006	-0.008	-0.132	0.059	-0.132	0.054
	(0.116)	(0.111)	(0.110)	(0.107)	(0.150)	(0.113)	(0.150)	(0.111)
Full ACA (with Medicaid Expansion)	-0.075	-0.055	-0.002	-0.026	-0.027	-0.046	-0.027	-0.057
	(0.108)	(0.105)	(0.099)	(0.094)	(0.112)	(0.108)	(0.112)	(0.113)
Sample Size	1,269,733	1,267,091	1,264,243	1,264,243	816,228	1,264,243	1,264,243	1,264,243

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	-0.046	-0.045	-0.101	-0.043	-0.059	-0.047	-0.052
	(0.085)	(0.101)	(0.099)	(0.099)	(0.078)	(0.079)	(0.078)
Medicaid Expansion	-0.029	0.164	0.025	-0.117	0.009	0.005	0.008
	(0.110)	(0.151)	(0.146)	(0.128)	(0.130)	(0.106)	(0.111)
Full ACA (with Medicaid Expansion)	-0.075	0.118	-0.076	-0.160	-0.050	-0.042	-0.044
	(0.103)	(0.097)	(0.119)	(0.154)	(0.121)	(0.098)	(0.094)
Sample Size	1,264,243	1,264,243	1,174,488	714,021	1,079,665	1,154,853	1,218,323

See notes for Appendix Table A2.

Appendix Table A7 – Implied Effect of ACA on Probability of being as Smoker at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	0.002	0.001	-0.002	-0.000	-0.009	0.002	0.002	0.003
	(0.010)	(0.010)	(0.009)	(0.009)	(0.006)	(0.012)	(0.012)	(0.012)
Medicaid Expansion	0.007	0.010	0.010	0.011	0.019*	0.011	0.010	0.010
	(0.011)	(0.010)	(0.009)	(0.009)	(0.009)	(0.012)	(0.012)	(0.011)
Full ACA (with Medicaid Expansion)	0.010	0.011	0.008	0.011	0.010	0.013	0.013	0.014
	(0.009)	(0.008)	(0.008)	(0.009)	(0.007)	(0.009)	(0.010)	(0.010)
Sample Size	1,307,003	1,304,045	1,300,819	1,300,819	841,849	1,300,819	1,300,819	1,300,819

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	0.000	0.000	-0.000	0.001	0.001	0.001	0.001
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.009)
Medicaid Expansion	0.013	0.019	0.006	0.017	0.011	0.006	0.011
	(0.010)	(0.013)	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)
Full ACA (with Medicaid Expansion)	0.014	0.019*	0.006	0.018	0.011	0.008	0.013
	(0.008)	(0.008)	(0.006)	(0.009)	(0.009)	(0.008)	(0.007)
Sample Size	1,300,819	1,300,819	1,207,869	736,307	1,110,938	1,188,282	1,253,655

See notes for Appendix Table A2.

Appendix Table A8 – Implied Effect of ACA on Number of Drinks per Month at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	0.720	0.670	0.619	0.667	-0.464	0.521	0.542	0.425
	(0.456)	(0.445)	(0.423)	(0.430)	(0.779)	(0.508)	(0.509)	(0.509)
Medicaid Expansion	0.029	0.061	-0.167	-0.123	1.940	-0.983	-0.162	-0.013
	(0.509)	(0.504)	(0.481)	(0.486)	(1.063)	(0.476)	(0.528)	(0.479)
Full ACA (with Medicaid Expansion)	0.749	0.732	0.452	0.544	1.476	0.422	0.379	0.413
	(0.496)	(0.505)	(0.545)	(0.571)	(0.752)	(0.648)	(0.677)	(0.674)
Sample Size	1,273,660	1,270,939	1,268,117	1,268,117	821,086	1,268,117	1,268,117	1,268,117

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	0.520	0.115	0.485	0.743	0.795	0.707	0.774
	(0.473)	(0.468)	(0.728)	(0.479)	(0.478)	(0.429)	(0.444)
Medicaid Expansion	-0.278	0.612	-0.022	-0.731	-0.187	0.132	-0.245
	(0.546)	(0.643)	(0.787)	(1.021)	(0.587)	(0.529)	(0.489)
Full ACA (with Medicaid Expansion)	0.242	0.726	0.463	0.012	0.608	0.839	0.529
	(0.634)	(0.557)	(0.651)	(0.982)	(0.777)	(0.623)	(0.613)
Sample Size	1,268,117	1,268,117	1,178,584	718,539	1,082,450	1,158,646	1,221,714

See notes for Appendix Table A2.

Appendix Table A9 – Implied Effect of ACA on Probability of Having Good or Better Health at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	-0.012*	-0.010	-0.009	-0.009	-0.015	-0.009*	-0.009*	-0.007
	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.004)	(0.004)	(0.004)
Medicaid Expansion	0.007	0.005	0.007	0.006	0.010	0.013	0.014	0.012
	(0.007)	(0.007)	(0.006)	(0.006)	(0.012)	(0.007)	(0.007)	(0.006)
Full ACA (with Medicaid Expansion)	-0.005	-0.005	-0.004	-0.003	-0.005	0.004	0.005	0.005
	(0.007)	(0.007)	(0.006)	(0.006)	(0.008)	(0.007)	(0.007)	(0.007)
Sample Size	1,332,950	1,328,431	1,321,799	1,321,799	852,112	1,321,799	1,321,799	1,321,799

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	-0.005	-0.004	-0.008	-0.010	-0.007	-0.009*	-0.008
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.004)	(0.005)
Medicaid Expansion	0.010	0.010	0.005	0.008	0.006	0.002	0.004
	(0.006)	(0.009)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)
Full ACA (with Medicaid Expansion)	0.004	0.006	-0.003	-0.002	-0.010	-0.007	-0.004
	(0.006)	(0.008)	(0.007)	(0.008)	(0.008)	(0.006)	(0.006)
Sample Size	1,321,799	1,321,799	1,226,723	745,721	1,129,381	1,206,947	1,274,025

See notes for Appendix Table A2.

Appendix Table A10 – Implied Effect of ACA on Probability of Having Very Good or Better Health at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	-0.003	-0.006	0.005	0.006	-0.001	0.007	0.006	0.008
	(0.007)	(0.006)	(0.005)	(0.005)	(0.009)	(0.006)	(0.006)	(0.006)
Medicaid Expansion	-0.005	-0.007	-0.008	-0.007	-0.001	-0.006	-0.002	-0.006
	(0.009)	(0.008)	(0.008)	(0.008)	(0.013)	(0.011)	(0.011)	(0.011)
Full ACA (with Medicaid Expansion)	-0.008	-0.008	-0.002	-0.002	-0.001	0.001	0.004	0.002
	(0.010)	(0.009)	(0.010)	(0.010)	(0.012)	(0.011)	(0.011)	(0.011)
Sample Size	1,332,950	1,328,431	1,321,799	1,321,799	852,112	1,321,799	1,321,799	1,321,799

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	0.008	0.008	0.010	0.003	0.006	0.006	0.005
	(0.005)	(0.005)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
Medicaid Expansion	-0.003	-0.006	-0.009	-0.011	-0.005	-0.005	-0.009
	(0.009)	(0.010)	(0.009)	(0.012)	(0.010)	(0.009)	(0.008)
Full ACA (with Medicaid Expansion)	0.005	0.001	0.000	-0.008	0.001	0.002	-0.004
	(0.010)	(0.009)	(0.011	(0.015)	(0.012)	(0.011)	(0.010)
Sample Size	1,321,799	1,321,799	1,226,723	745,721	1,129,381	1,206,947	1,274,025

See notes for Appendix Table A2.

Appendix Table A11 – Implied Effect of ACA on Probability of Having Excellent Health at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	0.004	0.005	0.008	0.008	0.009	0.006	0.005	0.006
	(0.006)	(0.006)	(0.005)	(0.005)	(0.007)	(0.007)	(0.008)	(0.008)
Medicaid Expansion	-0.001	-0.004	-0.003	-0.003	-0.017	0.004	0.008	0.005
	(0.007)	(0.007)	(0.007)	(0.007)	(0.011)	(0.010)	(0.010)	(0.009)
Full ACA (with Medicaid Expansion)	0.002	0.002	0.004	0.005	-0.008	0.010	0.013	0.011
	(0.007)	(0.007)	(0.006)	(0.006)	(0.009)	(0.008)	(0.009)	(0.008)
Sample Size	1,332,950	1,328,431	1,321,799	1,321,799	852,112	1,321,799	1,321,799	1,321,799

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	0.009	0.013*	0.007	0.010	0.008	0.007	0.008
	(0.005)	(0.006)	(0.004)	(0.005)	(0.006)	(0.005)	(0.005)
Medicaid Expansion	-0.002	-0.006	0.001	0.007	-0.007	0.003	-0.004
	(0.007)	(0.011)	(0.006)	(0.008)	(0.007)	(0.007)	(0.007)
Full ACA (with Medicaid Expansion)	0.007	0.007	0.008	0.017	0.001	0.010	0.004
	(0.005)	(0.008)	(0.005)	(0.007)	(0.006)	(0.006)	(0.006)
Sample Size	1,321,799	1,321,799	1,226,723	745,721	1,129,381	1,206,947	1,274,025

See notes for Appendix Table A2.

Appendix Table A12 – Implied Effect of ACA on the Number of Days Not in Good Physical Health at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	-0.012	-0.052	-0.131	-0.118	-0.155	-0.173	-0.173	-0.216
	(0.135)	(0.127)	(0.113)	(0.113)	(0.110)	(0.135)	(0.135)	(0.126)
Medicaid Expansion	0.045	0.079	0.057	0.068	0.229	0.053	0.053	0.061
	(0.118)	(0.116)	(0.107)	(0.109)	(0.260)	(0.150)	(0.152)	(0.136)
Full ACA (with Medicaid Expansion)	0.033	0.027	-0.075	-0.050	0.074	-0.120	-0.120	-0.156
	(0.144)	(0.142)	(0.132)	(0.126)	(0.247)	(0.144)	(0.145)	(0.146)
Sample Size	1,320,243	1,316,045	1,309,624	1,309,624	844,163	1,309,624	1,309,624	1,309,624

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	-0.142	-0.241	-0.111	-0.074	-0.171	-0.118	-0.138
	(0.113)	(0.125)	(0.120)	(0.137)	(0.121)	(0.118)	(0.116)
Medicaid Expansion	0.045	0.114	0.164	0.030	0.127	0.036	0.009
	(0.116)	(0.177)	(0.130)	(0.224)	(0.121)	(0.097)	(0.114)
Full ACA (with Medicaid Expansion)	-0.097	-0.127	0.053	-0.044	-0.044	-0.082	-0.046
	(0.130)	(0.143)	(0.144)	(0.250)	(0.146)	(0.128)	(0.130)
Sample Size	1,309,624	1,309,624	1,215,345	738,477	1,118,979	1,195,925	1,262,176

See notes for Appendix Table A2.

Appendix Table A13 – Implied Effect of ACA on the Number of Days Not in Good Mental Health at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	-0.008	-0.026	-0.076	-0.008	0.030	-0.094	-0.102	-0.097
	(0.016)	(0.146)	(0.156)	(0.155)	(0.122)	(0.213)	(0.206)	(0.212)
Medicaid Expansion	-0.115	-0.085	-0.057	-0.068	-0.149	-0.250	-0.224	-0.256
	(0.164)	(0.162)	(0.176)	(0.178)	(0.282)	(0.226)	(0.217)	(0.212)
Full ACA (with Medicaid Expansion)	-0.123	-0.111	-0.133	-0.149	-0.120	-0.344*	-0.326	-0.353*
	(0.120)	(0.124)	(0.120)	(0.126)	(0.259)	(0.162)	(0.169)	(0.169)
Sample Size	1,321,277	1,317,107	1,310,641	1,310,641	844,984	1,310,641	1,310,641	1,310,641

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	-0.157	-0.284	-0.106	-0.072	-0.050	-0.078	-0.103
	(0.180)	(0.193)	(0.184)	(0.164)	(0.165)	(0.155)	(0.152)
Medicaid Expansion	-0.092	-0.066	0.050	-0.063	0.028	-0.043	-0.067
	(0.183)	(0.239)	(0.200)	(0.211)	(0.191)	(0.174)	(0.183)
Full ACA (with Medicaid Expansion)	-0.249	-0.350	-0.057	-0.136	-0.022	-0.121	-0.170
	(0.130)	(0.131)	(0.132)	(0.158)	(0.133)	(0.131)	(0.134)
Sample Size	1,310,641	1,310,641	1,216,192	739,295	1,119,831	1,196,872	1,263,185

See notes for Appendix Table A2.

Appendix Table A14 – Implied Effect of ACA on the Number of Days with Health-Related Limitations at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	-0.035	-0.052	-0.129	-0.121	0.073	-0.158	-0.159	-0.179
	(0.132)	(0.127)	(0.143)	(0.141)	(0.101)	(0.195)	(0.192)	(0.193)
Medicaid Expansion	0.176	0.198	0.206	0.226	-0.107	0.116	0.119	0.114
	(0.176)	(0.176)	(0.177)	(0.164)	(0.238)	(0.202)	(0.179)	(0.191)
Full ACA (with Medicaid Expansion)	0.141	0.146	0.076	0.105	-0.035	-0.042	-0.040	-0.065
	(0.182)	(0.189)	(0.179)	(0.154)	(0.213)	(0.200)	(0.192)	(0.206)
Sample Size	1,320,243	1,316,045	1,309,624	1,309,624	844,163	1,309,624	1,309,624	1,309,624

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Full Early Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	-0.165	-0.138	-0.059	0.027	-0.168	-0.069	-0.157
	(0.165)	(0.207)	(0.142)	(0.186)	(0.143)	(0.148)	(0.140)
Medicaid Expansion	0.229	-0.094	0.274	0.360	0.303	0.273	0.280
	(0.168)	(0.252)	(0.166)	(0.254)	(0.169)	(0.156)	(0.162)
Full ACA (with Medicaid Expansion)	0.064	-0.232	0.121	0.386	0.136	0.204	0.121
	(0.165)	(0.175)	(0.165)	(0.235)	(0.180)	(0.132)	(0.161)
Sample Size	1,309,624	1,309,624	1,215,345	738,477	1,118,979	1,201,881	1,262,176

See notes for Appendix Table A2.

Appendix Table A15 – Implied Effect of ACA the Health Index at Mean Pre-Treatment Uninsured Rate: Robustness Checks

	Demographic Controls Only	Demographic and Family Controls	Demographic and Economic Controls	Demographic and Exchange Controls	Drop Cell Phone Sample	<138% FPL Medicaid, >100% Private	<100% FPL Medicaid, >100% Private	<138% FPL Medicaid, >138% Private
ACA without Medicaid Expansion	-0.015	-0.010	0.001	-0.001	0.017	0.001	0.001	0.004
	(0.022)	(0.019)	(0.019)	(0.019)	(0.025)	(0.026)	(0.026)	(0.025)
Medicaid Expansion	-0.004	-0.011	-0.013	-0.014	-0.013	0.007	0.005	0.005
	(0.110)	(0.20)	(0.021)	(0.021)	(0.032)	(0.027)	(0.027)	(0.026)
Full ACA (with Medicaid Expansion)	-0.019	-0.021	-0.012	-0.015	0.004	0.007	0.006	0.009
	(0.020)	(0.019)	(0.017)	(0.016)	(0.020)	(0.021)	(0.022)	(0.022)
Sample Size	1,320,243	1,316,045	1,309,624	1,309,624	844,163	1,309,624	1,309,624	1,309,624

	Uninsured Rate from 2011-2013	State Baseline 2013 Uninsured Rate	Drop 19-25 Year Olds	Drop All States with Early Expansion	Drop Treated States with Early Expansion	Drop States with Early Full Expansion	Drop Late 2014 and 2015 Expanders
ACA without Medicaid Expansion	0.008	0.017	0.004	-0.008	0.001	-0.005	-0.002
	(0.022)	(0.025)	(0.023)	(0.023)	(0.021)	(0.021)	(0.020)
Medicaid Expansion	-0.007	0.014	-0.018	-0.027	-0.018	-0.013	-0.018
	(0.023)	(0.030)	(0.024)	(0.028)	(0.023)	(0.021)	(0.021)
Full ACA (with Medicaid Expansion)	0.001	0.004	-0.013	0.035	-0.017	-0.018	-0.017
	(0.018)	(0.020)	(0.017)	(0.025)	(0.019)	(0.017)	(0.017)
Sample Size	1,309,624	1,309,624	1,215,345	738,477	1,118,979	1,209,699	1,262,176

See notes for Appendix Table A2.