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INSURANCE EXPANSIONS AND CHILDREN'S USE OF SUBSTANCE USE DISORDER
TREATMENT

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Insurance Expansions and Children's Use of Substance Use Disorder Treatment
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ABSTRACT

We provide the first evidence on the effects of expansions to private and public insurance programs on children's use of specialty substance use disorder (SUD) treatment. We combine administrative government data over the period 1996 to 2017 with quasi-experimental differences-in-differences methods to study this question. Expansions of the private market – laws that compel insurers to cover SUD treatment services as parity with general healthcare – increase admissions by 21%. Increases in admissions are driven by patients with private coverage and receiving outpatient care. The number of admissions of patients with no insurance also increases following parity law adoption. There is mixed evidence on changes in admissions following a public insurance expansion that increases the income eligibility thresholds for Medicaid and the Children's Health Insurance Program.

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1. Introduction

Childhood is a key developmental period in establishing health and human capital trajectories (Heckman 2006). During childhood the prefrontal cortex region of the brain is developing and many substance use disorders (SUDs) emerge; therefore treatment receipt at this time period can have lifecourse benefits (Winters, Botzet, and Fahnhorst 2011; Anderson et al. 2010; Clark, Thatcher, and Tapert 2008). Policy and economic ‘shocks’ experienced during childhood can persistently shape SUDs (Kaestner and Yarnoff 2011; Maclean 2015). Therefore, identifying factors that influence SUD treatment-seeking among children is important for understanding lifecourse health trajectories. Key barriers to treatment-seeking are inability to pay and lack of insurance coverage (Center for Behavioral Health Statistics and Quality 2018). Expanding insurance coverage may encourage treatment takeup by children and therefore improve lifecourse health. To date the literature has not explored this important question, which suggests that the full benefits of insurance policies that expand coverage, both private and public, may not be recognized.

According to the American Psychiatric Association (2013), SUDs ‘occur when the recurrent use of alcohol and/or drugs causes clinically and functionally significant impairment, such as health problems, disability, and failure to meet major responsibilities at work, school, or home.’ Diagnosis is based ‘on evidence of impaired control, social impairment, risky use, and pharmacological criteria.’ 4.3% of U.S. children 12 to 17 and 7.5% of the general population meets diagnostic criteria for an SUD (Center for Behavioral Health Statistics and Quality 2017). SUDs impose costs on society including crime, healthcare costs, and reduced labor market productivity (Terza 2002; Carpenter 2007; Balsa et al. 2009). The estimated annual costs of substance use in the U.S. are \$544B, inflated to 2019 dollars using the Consumer Price Index

(Caulkins, Kasunic, and Lee 2014). Effective SUD treatments are available (Rajkumar and French 1997; Lu and McGuire 2002; Murphy and Polsky 2016), but only 10% of treatment needs are met for children (Center for Behavioral Health Statistics and Quality 2018).

This study is the first to explore the effects of state-level private and public insurance expansions on specialty SUD treatment utilization among children 12 to 17. A specialty SUD treatment facility is a hospital, residential facility, outpatient treatment facility, or other facility with an SUD treatment program. While not the only modality available to children, specialty care accounts for 37% of all SUD treatment spending in the U.S. (Substance Abuse and Mental Health Services Administration 2013) and reflects 65% of SUD treatment received by children (Center for Behavioral Health Statistics and Quality 2016).

We apply differences-in-differences (DD) style models and exploit plausibly exogenous variation in insurance coverage generated by two sets of state-level policies. First, passage of state laws that compel private insurers to cover SUD treatment at ‘parity’ with general healthcare services allow us to study expansions of the private market. Second, increases in the income eligibility thresholds for state Medicaid programs and the Children’s Health Insurance Program (CHIP) offer us the ability to study how increases in public coverage influence SUD treatment use. While we do not study a public expansion of specialty SUD treatment coverage specifically, both Medicaid and CHIP cover these services. Thus, raising the income eligibility threshold increases the number of children eligible for coverage that includes specialty SUD treatment services. We combine this state policy variation with the Treatment Episode Data Set (TEDS), an administrative data source maintained by the federal government to monitor specialty SUD treatment receipt, over the period 1996 to 2017.

This paper is organized as follows. Section 2 outlines a conceptual framework, background on private and public insurance programs in the U.S., and related literature. Data, variables, and methods are listed in Section 3. Results are reported in Section 4. Sensitivity analyses are discussed in Section 5. Finally, Section 6 concludes.

2. Conceptual framework, background, and literature

2.1 Conceptual framework

Economic theory suggests that private and public insurance expansions, by reducing the price of healthcare and/or increasing quality, should increase the amount of healthcare consumed (Corman and Grossman 1985; Grossman 1972). Parity laws and public insurance expansions reduce the cost of SUD treatment for covered individuals. For parity laws, in addition to financial cost reductions, non-quantitative utilization management techniques (e.g., annual service limitations and prior authorization) are also reduced. Thus, all else equal, the quantity of services demanded should increase follow a parity law adoption or a public insurance expansion.

Quality of care plausibly improves following insurance expansions, with variation across private and public coverage. Gaining access to insurance can allow patients to receive care from a wider range of providers (Sloan, Mitchell, and Cromwell 1978; McGinty et al. 2015). Newly accessible providers may be objectively higher quality or, due to heterogeneity in patient-provider match quality, allow for better matches. The ability to access cost-prohibitive treatment modalities (e.g., residential vs. non-intensive outpatient) post-expansion may allow more appropriate matching of patients to treatment, increasing quality. Reductions in non-quantitative utilization management techniques by parity laws may allow privately covered patients to more quickly access appropriate care and/or may allow adequate treatment duration, both of which increase treatment quality (National Institute on Drug Abuse 2018). Through overall improved

alignment of patient need with providers and services, expansions may allow for better acute care and disease management after initial SUD stabilization, also leading to higher quality care.

Several factors may mute price and quantity effects. There are well-established capacity constraints within the SUD treatment delivery system and many providers have limited capital resources that may prevent them from absorbing increased demand from the individuals who gain access to services following an expansion (Buck 2011). Insurance acceptance has historically been low among SUD treatment providers; insurance that cannot be used to pay for treatment is unlikely to affect quantity consumed. Stigma and/or lack of motivation to stop using substances may temper increases in quantity consumed. However, we note that public discourse that occurs with an insurance expansion – in particular a parity law which specifically targets SUD treatment – may reduce stigma and/or increase awareness of treatment benefits. Insurance may *increase* SUDs and need for treatment through income effects, *ex ante* moral hazard, and/or increased access to addictive medications. Patients may prefer to receive care in outpatient settings even when they have access to more costly residential settings (Boone et al. 2004).

Finally, increases in premiums following a parity law adoption may lead some beneficiaries to drop private coverage (French, Maclean, and Popovici 2017; Bailey and Blascak 2016; Bailey 2014). Further, if public insurance expansions crowd out private coverage (Cutler and Gruber 1996), some patients will drop the more costly private insurance and take up the less costly public insurance which should increase use. While public insurance offers broader SUD coverage than private coverage (Garfield, Lave, and Donohue 2010), inability to access providers for the publicly insured (Decker 2012) may mute enhanced quality. Declines in effective quality attributable to crowd-out should reduce use.

We estimate the net effect of insurance expansions on children's use of specialty SUD treatment in our empirical models. We hypothesize that post-expansion:

H1: Total admissions will increase.

H2: Admissions for patients with private and public coverage will increase

H3: Admissions to more intensive treatment settings will increase.

2.2 Private insurance

State parity laws that compel private insurers to provide the same level of coverage for alcohol and drug treatment as they do for general healthcare services provide the variation we use for identification in our empirical models. Starting in the early 1990s, states gradually began to introduce such legislation, and the federal government followed suit with the Mental Health Parity and Addiction Equity Act (MHPAEA), passed in 2008 and effective in 2010 (with final regulations established in 2013). This federal Act is a 'parity-if-offered' law for private insurers, however, in combination with Affordable Care Act of 2010 (ACA) MHPAEA requires parity. Pre-ACA, insurers were not compelled to offer SUD treatment, but, if offered, services had to be covered at parity with general healthcare. Post-ACA, most private plans must comply with MHPAEA, thus the two laws provide full parity. The state-level policies we utilize here are more varied, and some states have gradually phased in stronger mandates after starting with weaker ones (Maclean, Popovici, and Stern 2018). We focus our analysis on strong parity mandates, but later examine potential differences of the parity laws' effects in states that did and did not already have (weaker) mandates in place.

2.3 Public insurance

We leverage variation in income eligibility in two major insurance programs to measure changes in children's access to public insurance: Medicaid and CHIP. We take the perspective

of the parent/guardian contemplating enrolling a child in public insurance: the name of the program is irrelevant, rather the more generous income eligibility level is salient.

Medicaid, a joint federal-state program introduced in the 1960s, is the primary insurer for low-income, non-elderly individuals in the U.S. Initially, states had primary control over eligibility, which was usually tied to cash welfare receipt and covered only acute care services (Office of the Assistant Secretary for Planning and Evaluation 2005). The scope of public insurance changed in the 1980s as the federal and state governments expanded Medicaid eligibility to less-poor populations. These expansions were targeted: federal coverage mandates applied first only to pregnant women and infants, and later to young children through age five. In the early 1990s, federal mandates and voluntary state expansions increased Medicaid eligibility for older children (i.e., six to 18). In 1996, federal welfare reform separated Medicaid from cash welfare benefits, establishing it as a standalone program. Since then, many states have increased Medicaid eligibility thresholds further into the income distribution.

Implemented in 1996, CHIP offers states a complementary policy lever to Medicaid. States can use CHIP funds to expand coverage for children through Medicaid expansions or supplemental CHIP programs. CHIP income eligibility thresholds are generally above thresholds for Medicaid. Further, there is some variation in services covered by CHIP.

In summary, Medicaid and CHIP form the public insurance landscape for low-income children. Parents/guardians enroll their child in the program for which they are income eligible. Over our study period, states have expanded Medicaid programs, developed CHIP programs, and chosen income eligibility thresholds for both programs. In 2016, 46M children were covered by one of these programs at some point (Centers for Medicare and Medicaid Services 2017).

2.4 Literature

This paper builds on two literatures: parity laws effects in private markets and expansions of public coverage. Our contribution is to study effects on children's specialty SUD treatment use, which has not been assessed before.

Our work contributes to further understanding of private coverage state and federal mandates for SUD treatment. First, state parity laws increase treatment use and reduce SUDs among adults. Dave and Mukerjee (2011); Maclean, Popovici, and Stern (2018); Wen et al. (2013); Wen, Hockenberry, and Cummings (2017); and French, Maclean, and Popovici (2017) show that passage of a parity law increased adult admissions to specialty SUD treatment by 9.0% to 12.1%. French, Maclean, and Popovici (2017) also document that passage of a full parity law reduced adult fatal alcohol poisonings and drug overdoses by 10%. Second, the federal parity law noted earlier, MHPAEA, increased adult SUD treatment use (McGinty et al. 2015; Busch et al. 2014; Ettner et al. 2016).

An important question when investigating state parity law effects is: does private coverage become more generous after the policy is adopted? To the best of our knowledge, there are no studies that examine this question. This dearth in the literature is potentially attributable to the difficulty in obtaining data on the specific details of private insurance plans over time and across multiple states that adopt, and do not adopt, a parity law. However, a series of recent studies establishes that, following passage of federal MHPAEA, private insurers increased SUD treatment service coverage and equalized many, but not all, dimensions of utilization management techniques between SUD and general healthcare services (Thalmayer et al. 2018; Friedman, Thalmayer, et al. 2018; Friedman, Azocar, et al. 2018; Thalmayer et al. 2017; Hodgkin et al. 2018; Horgan et al. 2015). These findings suggest that private coverage becomes more generous following a parity law adoption.

A broader set of private and public changes were introduced with the Affordable Care Act of 2010 (ACA) and have also been examined for their effects on SUD treatment. On the private side, the ACA dependent coverage mandate increased private coverage access for young adults who could remain on parental policies through age 26 (vs. 19). Evidence on this provision is mixed. Golberstein et al. (2015) show that the provision increased SUD-related hospitalizations, but Saloner and Cook (2014) and Akosa Antwi, Moriya, and Simon (2015) find no change in self-reported SUD treatment and SUD-related hospitalizations. Finally, Saloner et al. (2018) document that specialty SUD treatment admissions decreased post-mandate. On the public side, the ACA expanded adult Medicaid eligibility in states that elected to accept enhanced federal funding for non-traditional adult populations and covered SUD treatment services, but did not increase child eligibility. These expansions increased prescriptions for SUD-related medications and adult admissions to specialty SUD treatment (Wen et al. 2017; Maclean and Saloner 2019; Meinhofer and Witman 2018; Grooms and Ortega 2019). Wen and colleagues (Wen, Hockenberry, and Cummings 2017; Wen, Druss, and Cummings 2015) show that pre-ACA Medicaid income eligibility and SUD service coverage expansions increased SUD treatment among adults.

State-specific eligibility expansions have also influenced SUD treatment. The 2006 Massachusetts healthcare reform increased public and private coverage. Analyses of this reform document that SUD-related hospitalizations and admissions to specialty SUD treatment increased among adults (Meara et al. 2014; Maclean and Saloner 2018). Baicker et al. (2017) study the effect of public insurance on SUD treatment using the Oregon Medicaid experiment. Use of medications to treat opioid use disorder was not different across adults given easier

Medicaid access relative to the control group. No other medications used to treat SUDs were included in the study.

3. Data, variables, and methods

3.1 TEDS

We use TEDS, an all-payer administrative database compiled annually by the Substance Abuse and Mental Health Services Administration (SAMHSA). TEDS contains the near universe of specialty SUD treatment facilities that receive financial support from the state or federal government, are certified by the state to provide SUD treatment, or are tracked for a state-specific reason. Annually, TEDS includes information on two million specialty SUD treatment admissions. Data are available from 1992 to 2017.

TEDS is a standard dataset used within health services research to study SUD treatment.(Maclean and Saloner 2019; Saloner et al. 2018; Anderson 2010; Grecu, Dave, and Saffer 2019) The federal government uses TEDS to estimate the national costs of SUD treatment (Office of National Drug Control Policy 2012). While TEDS is not nationally representative, patients treated in TEDS-tracked facilities are representative of the SUD treatment-receiving population (Gfroerer et al. 2014).

We exclude admissions for patients older than 17 years; age categories in TEDS do not allow us to include 18 year olds. We exclude detoxification-only services as they are not viewed as treatment (Center for Substance Abuse Treatment 2006). Although TEDS initiated in 1992, we begin our study period in 1996, a pivotal point in public insurance programs. In earlier years, there was no separate public insurance for children 12 to 17. In 1996, Medicaid was delinked from cash welfare and became a standalone program. Prior to 1996, we cannot sufficiently

disentangle public insurance effects from effects of other public assistance programs, which prevents clean identification of treatment effects.

We consider three samples: (i) all admissions, (ii) admissions not referred through the criminal justice system, and (iii) admissions referred through the criminal justice system. We suspect that admissions not referred from the criminal justice system are potentially motivated by factors included in economic models of the demand for healthcare described in the conceptual framework. In contrast, admissions referred to treatment through the criminal justice system may be guided by other factors (e.g., judicial discretion in sentencing). Hence, we want to allow for such heterogeneity in our empirical models. As we note later in the manuscript, not all treatment modalities we study result in a patient being ‘admitted’ to treatment (e.g., outpatient care) but we use the term ‘admissions’ for brevity and to align with previous work.

3.2 Private insurance

We examine the effects of state laws that compel private insurers to cover SUD treatment at ‘parity’ with general healthcare services. We use legal data from Maclean, Popovici, and Stern (2018) to construct our parity law variable. We match law effective dates to the TEDS as of January 1st in each year. During our study 12 states passed parity laws. Maryland was the first state in the U.S. to do so in 1994. Figure 1 displays the geographic variation in the states that passed a parity law by 2013. The majority of state laws were adopted in the 2000s and span all four regions of the country. The ACA, in combination with MHPAEA, required parity for SUD treatment services as of January 2014. Therefore, we code all states as having full parity from 2014 to 2017.

Appendix Table 1 reports the effective date for each parity law and whether states transitioned from no regulation of SUD treatment to parity or from a weaker law (e.g., mandated

benefits) to full parity. The strength of a parity law potentially varies across states based on the regulation in place prior to passage of the law. However, given differences in the states that transitioned from no regulation and a weak law to parity in terms of driving frequency, healthcare system, and social norms towards substance use and SUD treatment, the extent to which we expect heterogeneity in the laws' effects is *ex ante* unclear.

3.3 Public insurance

There is no central repository of states' Medicaid and CHIP income eligibility thresholds. We use several sources to assemble older children's thresholds (relative to the Federal Poverty Level, 'FPL') in each state (full details available on request). Figure 2 reports states with thresholds above 200% FPL (roughly the average our sample period) in four years of our study: 1996, 2002, 2009, and 2017. Appendix Table 2 reports the exact threshold for each state in each year of our study period. We consider the more generous of a state's Medicaid or CHIP income eligibility threshold in a particular year to proxy for children's public insurance access. We combine data on each state's Medicaid and CHIP income thresholds and select the higher value in January of each year as our measure of the public insurance eligibility threshold.

For Medicaid and CHIP expansions to influence SUD treatment, these insurance programs must cover such treatment. The federally-mandated Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit, implemented in 1967 by Congress, ensures that Medicaid and Medicaid-CHIP cover medically-necessary SUD treatment. While stand-alone CHIP programs are not under the mandate, our examination of state-specific coverage as described in think tank reports and articles indicates that CHIP covers the services we study (Pernice et al. 2001; Pernice et al. 1999; Kaye, Pernice, and Cullen 2006; Garfield et al. 2012); full details are available on request.

3.4 Outcomes

We consider several insurance and specialty SUD treatment outcomes. In particular, we consider total admissions and admissions by patient’s insurance coverage: private, any public (Medicaid, Medicare, and other public; recorded as a single category in TEDS), and no insurance. We also study the effect of policy changes on treatment setting: residential or hospital (‘residential’), intensive outpatient (i.e., treatment lasting two or more hours per day for three or more days per week), and non-intensive outpatient (i.e., ambulatory treatment services including individual, family, and/or group services, and may include pharmacological therapies).

While states are mandated by federal law to provide admissions data to TEDS, submission of patient insurance coverage information is voluntary. Thus, there is a non-trivial amount of missing insurance information. We follow the literature and retain state/year pairs with no more 25% of the insurance information missing (Maclean and Saloner 2019). Appendix Table 3 reports the states in our analysis sample and the full TEDS sample. We have 42 states in our analysis sample.

3.5 Empirical Model

We estimate a differences-in-differences (DD) style model:

$$(1) \quad Outcome_{s,t} = \alpha_0 + \alpha_1 Parity_{s,t} + \alpha_2 Public_{s,t} + \alpha_3 X_{s,t} + S_s + \tau_t + \varepsilon_{s,t}$$

$Outcome_{s,t}$ is an insurance or SUD treatment outcome among children 12 to 17 years in state s in year t . $Parity_{s,t}$ is an indicator for a parity law in state s in time t . $Public_{s,t}$ is the income eligibility threshold (FPL) for children’s public health insurance in each state-year. For example, a state with a threshold of 150% FPL is coded as 1.5.¹ S_s and τ_t are vectors of state

¹ In an earlier version of this paper, we used a categorical public insurance variable. Based on very helpful comments from several readers, we have elected to use a linear measure in this version. In particular, readers raised concerns about the interpretation of the findings. Using the categorical variable suggests that lower income

and year fixed-effects. $\varepsilon_{s,t}$ is the error term. We use a Poisson model and report marginal effects with 95% confidence intervals that account for within-state correlations (Bertrand, Duflo, and Mullainathan 2004). The state population ages 12 to 17 is the exposure variable; we calculate age-shares from the American Community Survey (Ruggles et al. 2017) and obtain state population from the U.S. Census (University of Kentucky Center for Poverty Research 2019). The data are unweighted.

4. Results

Table 1 reports summary statistics for the full sample and samples defined by referral status: non-criminal justice referred and criminal justice referred. The average number of total admissions is 1,543 children with 340, 565, and 538 admissions for patients with private coverage, public coverage, and no coverage. In terms of treatment setting, an average of 285, 218, and 1,030 children are admitted to residential, intensive outpatient, and non-intensive outpatient treatment per state-year. Total admissions are roughly split between admissions not referred and referred through the criminal justice system. During our study period, 28% of state-year pairs have a full parity law in place and the average income threshold for public insurance eligibility is 2.09 (or 209% of FPL).

Table 2 reports results from our DD models. Panel A lists results based on the full sample of admissions while Panels B and C list results based on the sample not referred through the criminal justice system and referred through this system. For brevity, we focus on Panel A as results are qualitatively similar across the three samples. We note that the similarity in coefficient estimates itself is potentially interesting, as we hypothesized that admissions referred

enrollees may be more responsive to public insurance expansions than the estimates reported in this version of the paper. Full details available on request.

to treatment through the criminal justice system and through other sources may be guided by different factors, but such differences do not appear to be empirically important in our context.

Following passage of a parity law total admissions increase by 308, with private admissions accounting for perhaps one-third of the increase. This implies a 20% and 30% increase relative to their sample means (all relative effect sizes are calculated in this manner henceforth) and is in line with our hypothesis of increased admissions post-parity law. Interestingly, the number of uninsured admissions also increases by 184 (or 34%), possibly indicating that the premium increase associated with the more generous benefits may lead some patients to drop coverage (French, Maclean, and Popovici 2017; Bailey and Blascak 2016; Bailey 2014). The estimated effects of mandates on public insurance admissions are of similar size but less precisely estimated.

The response to public coverage expansions appears to be more limited, and may not even be positive. Estimates are not statistically different from zero, and those for the non-criminal-justice admissions are particularly close to zero.

Table 3 reports effects of expansions on admissions by treatment setting. The observed increases in admissions following parity law adoption appear to be driven by intensive and non-intensive outpatient treatment, where admissions increase by 136 and 210 (62% and 20%) respectively. Public insurance adoption effects are not precisely estimated in the overall sample, but the criminal justice estimates are suggestive of some substitution in care intensity, with movement away from non-intensive outpatient toward intensive outpatient care.

5. Sensitivity Analysis

We report a range of different specifications. Our results are broadly stable across the sensitivity checks that we apply, although we note that we lose precision in some specifications.

First, we exclude all time-varying state-level controls from the regression model (Appendix Tables 4A to 4B). Second, we exclude the years in which the major Medicaid expansions of the ACA were in effect (i.e., 2014 to 2017), since this Act transformed the healthcare delivery system in ways that we may not accurately model (Appendix Tables 5A to 5B). Third, we apply population weights where the weight is the state population ages 12 to 17 years (Appendix Tables 6A to 6B). The estimated effects of parity in this weighted model remain similar to the main estimates, while the estimated effects of public insurance expansion are more precisely estimated and consistently negative than the main estimates. This apparently perverse effect of expanded eligibility may reflect movement in the locus of care to primary care or other non-specialty services (which we cannot explore in TEDS). Fourth, we estimate least squares regression and convert outcomes to a rate per 100,000 children 12 to 17 years (Appendix Tables 7A to 7B). Failure to handle the count data with a count model seems to dilute the estimated effects, sometimes to near zero. We exclude the state of Maryland as it had already implemented parity before the study period and is therefore a ‘treated control’ (Appendix Table 1). Results are listed in Appendix Tables 8A to 8B.

Next we explore heterogeneity in treatment effects. We estimate our regressions separately for states based on their pre-parity legal landscape. In one sample we use treatment states (those that adopted a parity law) that had no legal protections for SUD treatment pre-law (Appendix Tables 9A to 9B) and in another sample we use treatment states that had some legal protection for these services that were less than full parity (Appendix Tables 10A to 10B). States that do not adopt a parity law are included in both samples. Overall effects are more likely to be statistically distinguishable from zero using states with a pre-law policy as the treatment group, perhaps because these states had an SUD treatment delivery system better equipped to absorb

increased demand for services. That said, there are compositional changes across insurance types even for the states without a pre-law policy; despite little aggregate change in admissions, private and uninsured admissions both rise, consistent with mandates both improving quality (leading to more private coverage) and premiums (leading to more uninsured). We include TEDS years 1992 to 1995 and estimate parity law effects; we do not control for public insurance as the variable is available only beginning in 1996 (Appendix Tables 11A to 11B).

We estimate event-study models to explore the extent to which our data can satisfy parallel trends. For the parity law variable, we estimate an event-study in the spirit of Autor (2003): we construct leads and lags around the event (Appendix Tables 12A to 12C and 13A to 13C). For the public insurance variable, which is continuous, how best to test parallel trends is less clear as there is no specific event, rather states increase, and in some cases decrease, income thresholds. We follow recent work by Bondurant, Lindo, and Swensen (2018) and Swensen (2015) and include the policy measured the years before ($t-1$) and after ($t+1$) the current period (Appendix Tables 14A to 14B). If we observe that the coefficient estimates on the policy variable measured in the $t-1$ period are statistically indistinguishable from zero, this pattern of results would provide suggestive evidence that our data satisfy parallel trends. While we note that some lead variables in the parity law event-studies do rise to the level of statistical significance in the year before policy adoption, these estimates appear to capture anticipation or ramp-up effects rather than clear differential trends (vs. comparison states) in the pre-period. We view our event-study results as supportive of the ability of our data to satisfy parallel trends.

We conduct an additional test of our design. We regress each of the insurance policy variables on all other covariates included in the regression model, i.e. we test the conditional independence assumption (Pei, Pischke, and Schwandt 2018). This exercise allows us to test

whether insurance policies are conditionally balanced across treatment and comparison groups; in the context of the public insurance variable (which is continuous) this test amounts to testing treatment *intensity* balance. Our covariates appear balanced (Appendix Table 15). ACA Medicaid expansion predicts public insurance generosity, but this finding likely reflect a state's overall public insurance strategy rather than covariate imbalance.

6. Conclusion

We provide the first evidence on the effect of U.S. state-level private and public insurance expansions on children's specialty SUD treatment use. While the insurance-elasticity of healthcare is a well-studied object within economics, the importance of expansions for children's use of specialty SUD treatment has not been previously examined suggesting that the full value of these policies has not been established. We leverage variation in coverage generated by state laws that require private insurers to cover SUD treatment 'at parity' with general healthcare, as well as increases in children's public insurance eligibility afforded by Medicaid and CHIP income expansions, over the period 1996 to 2017.

We find that adoption of a state parity law increases the number of children in treatment by 21% and this increase is driven by children with private coverage and receiving care in outpatient settings. However, we also observe that the number of children with no coverage increases following a parity law adoption, which suggests that price increases attributable to the newly covered benefits – which are high cost to insurers (Gruber 1994)– lead some children to lose private coverage and this coverage is not replaced with public coverage. We observe no evidence that admissions increase as income thresholds for public insurance rise, though there may be some movement across treatment modalities.

Many governments are considering how to provide healthcare at reasonable cost. Understanding how expansions affect service use is important. In the U.S. there have been recent Congressional attempts to roll back SUD treatment provisions of the ACA, which compel insurers to cover SUD treatment, and throughout its history CHIP has faced funding uncertainty (Congressional Budget Office 2017; Kaiser Family Foundation 2018). Our findings can help policymakers who are investigating these issues.

Table 1. Summary statistics: Treatment Episode Data Set 1996-2017

Variable:	All admissions	Non-criminal justice system admissions	Criminal justice system admissions
<i>Admissions</i>			
Total	1533.7	741.3	792.5
<i>Admissions by insurance status</i>			
Private insurance	339.5	190.3	149.2
Public insurance	656.3	322.4	333.9
No insurance	538.0	228.6	309.4
<i>Admissions by treatment setting</i>			
Residential	285.2	139.7	145.5
Intensive outpatient	218.2	98.1	120.1
Non-intensive outpatient	1030.3	503.4	526.8
<i>State-level insurance variables</i>			
Full parity law	0.28	--	--
Public insurance (/100)	2.09	--	--
<i>State-level demographics</i>			
HIFA Medicaid waiver	0.080	--	--
ACA Medicaid expansion	0.095	--	--
Medical marijuana legalized	0.20	--	--
Recreational marijuana legalized	0.015	--	--
Prescription drug monitoring program	0.59	--	--
Small business share	0.37	--	--
Poverty rate	12.7	--	--
Unemployment rate	0.056	--	--
Governor Democrat	0.43	--	--
Age	36.7	--	--
Male	0.49	--	--
Female	0.51	--	--
Hispanic ethnicity	0.089	--	--
White	0.18	--	--
African American	0.31	--	--
Other race	0.27	--	--
Less than high school	0.24	--	--
High school	0.81	--	--
Some college	0.11	--	--
College graduate	0.080	--	--
Population of kids 12 to 17	387016.8	--	--
Observations	779	779	779

Notes: Unit of observation is a state-year. Data are unweighted.

Table 2. Effect of insurance expansions on total and coverage admission counts: Treatment Episode Data Set 1996-2017

Outcome	Total	Private	Public	No insurance
<i>All admissions</i>				
Sample mean	1533.7	339.5	656.3	538.0
Full parity law	308*** [104,512]	105*** [26,184]	142 [-81,366]	184** [11,357]
Public insurance (/100)	-98 [-361,165]	-7 [-88,73]	-67 [-269,135]	-48 [-166,70]
Observations	779	779	779	779
<i>Non-criminal justice system admissions</i>				
Sample mean	741.3	190.3	322.4	228.6
Full parity law	161*** [47,275]	76*** [21,130]	83 [-59,225]	60* [-4,123]
Public insurance (/100)	-0 [-140,139]	6 [-39,51]	-9 [-113,95]	-10 [-63,44]
Observations	779	779	779	779
<i>Criminal justice system admissions</i>				
Sample mean	792.5	149.2	333.9	309.4
Full parity law	151** [27,275]	40** [7,73]	55 [-39,149]	123** [7,239]
Public insurance (/100)	-107 [-247,32]	-22 [-62,19]	-61 [-163,41]	-38 [-108,33]
Observations	779	779	779	779

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state characteristics, state fixed effects, and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

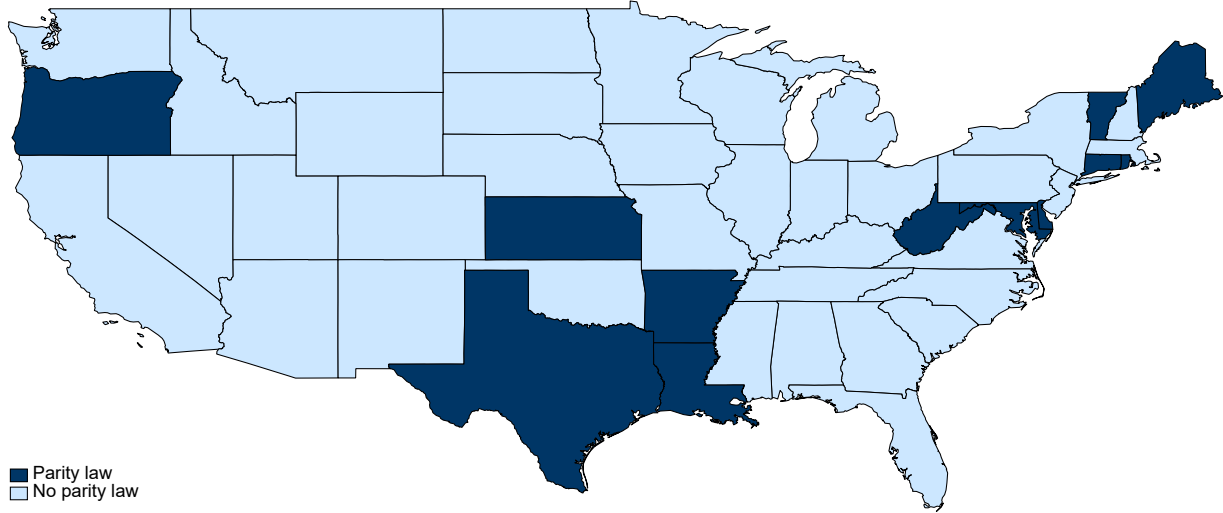
***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Table 3. Effect of insurance expansions on admission counts by treatment setting: Treatment Episode Data Set 1996-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
<i>All admissions</i>			
Sample mean	285.2	218.2	1030.3
Full parity law	16	136*	210***
	[-59,90]	[-0,272]	[72,347]
Public insurance (/100)	-36	53	-141
	[-110,38]	[-12,117]	[-360,78]
Observations	779	779	779
<i>Non-criminal justice system admissions</i>			
Sample mean	139.7	98.1	503.4
Full parity law	22	52**	120***
	[-16,59]	[1,104]	[38,203]
Public insurance (/100)	-13	19	-20
	[-51,26]	[-11,50]	[-136,96]
Observations	779	779	779
<i>Criminal justice system admissions</i>			
Sample mean	145.5	120.1	526.8
Full parity law	-4	73*	102**
	[-54,46]	[-10,156]	[12,193]
Public insurance (/100)	-23	37*	-137**
	[-59,13]	[-1,75]	[-249,-25]
Observations	779	779	779

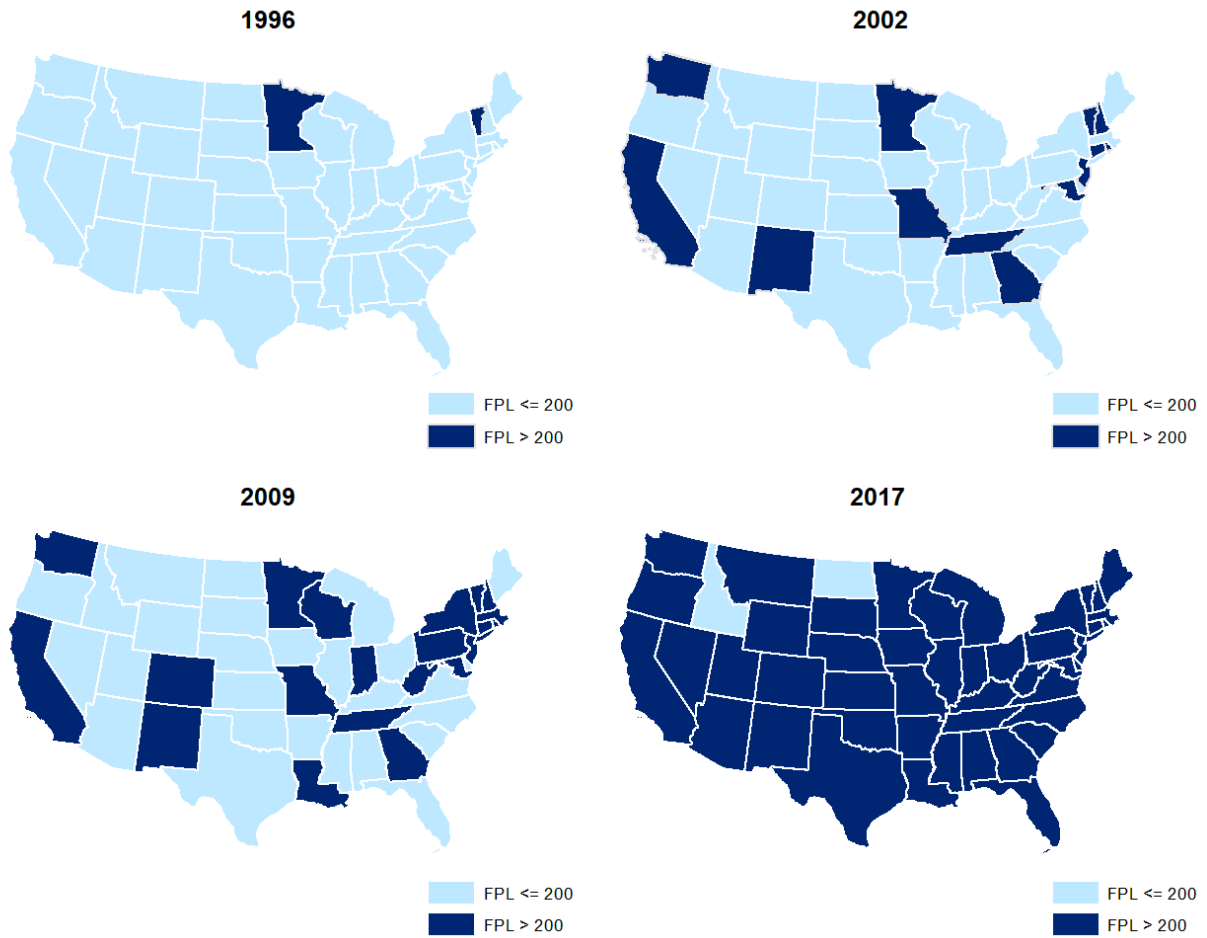
Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state characteristics, state fixed effects, and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.
 ***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Figure 1. States that have adopted a full parity law by 2013



Notes: See text for details. Alaska and Hawaii are suppressed for ease of viewing the figure, but these states did not adopt a parity law. Note all states, due to the ACA and MHPAEA are considered full parity states over the period 2014 to 2017. We acknowledge that Rhode Island and Vermont appear in our sample. See Appendix Table 3.

Figure 2. States with public insurance at or above 200% of FPL over the study period



Notes: See text for details. Alaska and Hawaii are suppressed for ease of viewing the figure. Alaska had an income threshold below 200% of FPL in all years 1996 to 1999 and 2004 and 2013. Hawaii had an income threshold below 200% of FPL in all years 1996 to 2000. We acknowledge that not all states appear in our sample. See Appendix Table 3.

Appendix Table 1. States that passed a parity law by 2017

State	Effective date	Parity law transition
Arkansas	October 2009	Mandated offer to parity
Connecticut	2000 (no month)	None to parity
Delaware	2001 (no month)	None to parity
Kansas	July 2009	Mandated benefits to parity
Louisiana	January 2009	Mandated benefits to parity
Maine	2003 (no month)	Mandated benefits to parity
Maryland	1994 (no month)	None to parity
Oregon	July 2007	Mandated benefits to parity
Rhode Island	2002 (no month)	Mandated benefits to parity
Texas	April, 2005	Mandated benefits to parity
Vermont	1998 (no month)	None to parity
West Virginia	2004 (no month)	None to parity

Notes: See text for details on parity law sources. Mandated offer laws require private insurers to offer coverage for SUD treatment to beneficiaries. This offer of coverage may or may not be at parity with medical/surgical services benefits and may be declined by the beneficiary. Mandated benefit laws require private insurers to cover a specified set of SUD treatment services. The set of covered services, which is typically not particularly generous (based on the authors' review of legal statutes, details available on request), can be subject to limits on service use and cost-sharing arrangements that are typically less comprehensive than those offered for medical/surgical services. If no month is listed, we assign July as the effective month. Some scholars classify Virginia as a parity state between 2000 and 2004,³⁶ however, this state does not appear in our sample. Further, we acknowledge that Rhode Island and Vermont do not appear in our sample. See Appendix Table 3.

Appendix Table 2. Public insurance income thresholds targeting children ages 6 to 18 as a percent of FPL

Year:	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Mean:	116	116	133	184	203	212	215	2011	212	213	213	218	226	229	243	244	245	245	262	259	259	259
AK	100	100	100	100	200	200	200	200	175	175	175	175	175	175	175	175	175	175	208	208	208	208
AL	100	100	100	200	200	200	200	200	200	200	200	200	200	200	300	300	300	300	317	317	317	317
AR	100	100	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	216	216	216	216
AZ	100	100	150	150	200	200	200	200	200	200	200	200	200	200	200	200	200	200	205	200	200	205
CA	100	100	100	200	250	250	250	250	250	250	250	250	250	250	250	250	250	250	266	266	266	266
CO	100	100	100	185	185	185	185	185	185	185	200	200	200	205	205	250	250	250	265	265	265	265
CT	185	185	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	323	323	323	323
DC	100	100	200	200	200	200	200	200	200	200	200	200	300	300	300	300	300	300	324	324	324	324
DE	100	100	100	100	200	200	200	200	200	200	200	200	200	200	200	200	200	200	217	217	217	217
FL	100	100	100	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	215	215	215	215
GA	100	100	100	200	200	200	235	235	235	235	235	235	235	235	235	235	235	235	252	252	252	252
HI	100	100	100	100	100	200	200	200	200	200	200	300	300	300	300	300	300	300	313	313	313	313
IA	100	100	100	185	185	200	200	200	200	200	200	200	200	200	300	300	300	300	380	307	307	307
ID	100	100	160	150	150	150	150	150	150	185	185	185	185	185	185	185	185	185	190	190	190	190
IL	100	100	133	185	185	185	185	185	200	200	200	200	200	200	200	200	200	200	318	318	318	318
IN	100	100	100	150	200	200	200	200	200	200	200	200	200	250	250	250	250	250	255	255	262	262
KS	100	100	100	200	200	200	200	200	200	200	200	200	200	200	241	241	238	232	250	247	244	243
KY	100	100	100	150	200	200	200	200	200	200	200	200	200	200	200	200	200	200	218	218	218	218
LA	100	100	100	133	150	200	200	200	200	200	200	200	200	250	250	250	250	250	255	255	255	255
MA	100	100	200	200	200	200	200	200	200	200	200	300	300	300	300	300	300	300	305	305	305	305
MD	185	185	185	200	200	200	300	300	300	300	300	300	300	300	300	300	300	300	322	322	322	322
ME	125	125	125	185	185	185	200	200	200	200	200	200	200	200	200	200	200	200	213	213	213	213
MI	150	150	150	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	217	217	217	217
MN	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	288	280	280	280
MO	100	100	100	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	305	305	305	305
MS	100	100	100	100	200	200	200	200	200	200	200	200	200	200	200	200	200	200	214	214	214	214
MT	100	100	100	150	150	150	150	150	150	150	150	150	175	175	250	250	250	250	266	266	266	266
NC	100	100	100	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	216	216	216	216
ND	100	100	100	100	140	140	140	140	140	140	140	140	140	150	160	160	160	160	175	175	175	175
NE	100	100	100	185	185	185	185	185	185	185	185	185	185	185	200	200	200	200	218	218	218	218
NH	185	185	185	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	323	323	323	323
NJ	100	100	100	200	350	350	350	350	350	350	350	350	350	350	350	350	350	350	355	355	355	355
NM	185	185	185	185	235	235	235	235	235	235	235	235	235	235	235	235	235	235	305	245	245	245
NV	100	100	100	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	205	205	205	205
NY	100	100	100	185	192	200	200	200	200	200	200	200	250	250	400	400	400	400	405	405	405	405
OH	100	100	100	150	150	200	200	200	200	200	200	200	200	200	200	200	200	200	211	211	211	211
OK	100	100	100	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	210	210	210	210
OR	100	100	100	170	170	170	170	170	185	185	185	185	185	185	300	300	300	300	305	305	305	305
PA	100	100	100	200	200	200	200	200	200	200	200	200	300	300	300	300	300	300	319	319	319	319
RI	100	100	100	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	266	266	266	266
SC	100	100	100	150	150	150	150	150	150	150	150	150	175	200	200	200	200	200	213	213	213	213

SD	100	100	100	133	140	200	200	200	200	200	200	200	200	200	200	200	200	200	209	209	209	209
TN	100	100	400	400	400	400	400	200	200	200	200	200	200	250	250	250	250	250	255	255	255	255
TX	100	100	100	100	100	200	200	200	200	200	200	200	200	200	200	200	200	200	206	206	206	206
UT	100	100	100	200	200	200	200	200	200	200	200	200	250	200	200	200	200	200	205	205	205	205
VA	100	100	100	185	185	200	200	200	200	200	200	200	200	200	200	200	200	200	205	205	205	205
VT	225	225	225	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	318	317	317	317
WA	200	200	200	200	250	250	250	250	250	250	250	250	300	250	300	300	300	300	305	317	317	317
WI	100	100	100	100	185	185	185	185	185	185	185	185	200	250	300	300	300	300	306	306	306	306
WV	100	100	100	100	150	200	200	200	200	200	200	220	200	220	250	250	300	300	305	305	305	305
WY	100	100	100	100	133	133	133	133	185	185	200	200	235	200	200	200	200	200	205	205	205	205

Notes: We acknowledge that not all states appear in our sample. See Appendix Table 3.

Appendix Table 3. States in the insurance and full sample: Treatment Episode Data Set 1996-2017

States	Insurance sample	Full TEDS sample
AK	19	19
AL	9	21
AR*	15	21
AZ	12	20
CA	--	22
CO	22	22
CT*	4	21
DC	15	18
DE*	16	19
FL	--	22
GA	9	20
HI	11	22
IA	11	22
ID	16	22
IL	21	22
IN	20	21
KS*	22	22
KY	20	21
LA*	12	22
MA	22	22
MD*	22	22
ME*	14	22
MI	5	22
MN	--	22
MO	21	22
MS	14	21
MT	22	22
NC	--	22
ND	21	22
NE	22	22
NH	22	22
NJ	22	22
NM	5	21
NV	10	22
NY	--	22
OH	--	22
OK	10	22
OR*	19	19
PA	22	22
RI*	--	22
SC	17	20
SD	14	22
TN	7	22
TX*	20	22
UT	18	22
VA	--	22
VT*	--	22
WA	--	22
WI	--	22
WV*	14	17
WY	7	21

Notes: Unit of observation is a state-year. Data are unweighted.

*Parity state. Note that Rhode Island and Vermont do not appear in our sample.

Appendix Table 4A. Effect of insurance expansions on total and coverage admission counts excluding time-varying state-level controls: Treatment Episode Data Set 1996-2017

Outcome	Total	Private	Public	No insurance
<i>All admissions</i>				
Sample mean	1533.7	339.5	656.3	538.0
Full parity law	394*** [210,578]	139** [31,246]	170 [-114,454]	214 [-105,532]
Public insurance (/100)	-119 [-462,224]	-9 [-91,73]	-74 [-321,173]	-58 [-205,88]
Observations	779	779	779	779
<i>Non-criminal justice system admissions</i>				
Sample mean	741.3	190.3	322.4	228.6
Full parity law	218*** [108,329]	106*** [34,178]	93 [-96,281]	60 [-66,187]
Public insurance (/100)	-18 [-198,162]	6 [-46,59]	-15 [-138,108]	-13 [-71,44]
Observations	779	779	779	779
<i>Criminal justice system admissions</i>				
Sample mean	792.5	149.2	333.9	309.4
Full parity law	174*** [62,286]	41* [-1,83]	73 [-54,200]	150 [-45,345]
Public insurance (/100)	-100 [-285,85]	-15 [-56,26]	-54 [-186,79]	-48 [-146,51]
Observations	779	779	779	779

Notes: Unit of observation is a state-year. Data are weighted by the state population 12 to 17 years of age. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state fixed effects and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 4B. Effect of insurance expansions on admission counts by treatment setting excluding time-varying state-level controls: Treatment Episode Data Set 1996-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
<i>All admissions</i>			
Sample mean	285.2	218.2	1030.3
Full parity law	21	120	266***
	[-74,116]	[-29,269]	[101,431]
Public insurance (/100)	-65	80*	-145
	[-165,34]	[-15,175]	[-394,104]
Observations	779	779	779
<i>Non-criminal justice system admissions</i>			
Sample mean	139.7	98.1	503.4
Full parity law	28	45	149***
	[-11,67]	[-21,110]	[64,234]
Public insurance (/100)	-25	26	-16
	[-78,28]	[-18,70]	[-155,123]
Observations	779	779	779
<i>Criminal justice system admissions</i>			
Sample mean	145.5	120.1	526.8
Full parity law	-4	72	121**
	[-68,60]	[-19,162]	[13,229]
Public insurance (/100)	-40	54**	-132*
	[-87,8]	[2,106]	[-272,8]
Observations	779	779	779

Notes: Unit of observation is a state-year. Data are weighted by the state population 12 to 17 years of age. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state fixed effects and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 5A. Effect of insurance expansions on total and coverage admission counts excluding the post-ACA period (2014-2017): Treatment Episode Data Set 1996-2013

Outcome	Total	Private	Public	No insurance
<i>All admissions</i>				
Sample mean	1689.9	384.9	690.6	614.4
Full parity law	444*** [141,748]	83* [-9,175]	251* [-47,548]	265** [36,494]
Public insurance (/100)	-87 [-345,171]	-16 [-94,63]	-30 [-209,149]	-51 [-193,91]
Observations	639	639	639	639
<i>Non-criminal justice system admissions</i>				
Sample mean	814.0	215.3	338.4	260.3
Full parity law	241*** [70,412]	65* [-3,133]	161* [-12,335]	85** [1,169]
Public insurance (/100)	15 [-125,155]	5 [-40,51]	7 [-84,97]	-4 [-68,59]
Observations	639	639	639	639
<i>Criminal justice system admissions</i>				
Sample mean	875.9	169.6	352.2	354.1
Full parity law	213** [41,385]	31 [-8,70]	93 [-39,225]	171** [23,319]
Public insurance (/100)	-122* [-264,21]	-28 [-67,11]	-45 [-139,49]	-48 [-134,37]
Observations	639	639	639	639

Notes: Unit of observation is a state-year. Data unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state characteristics, state fixed effects, and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 5B. Effect of insurance expansions on admission counts by treatment setting excluding the post-ACA period (2014-2017): Treatment Episode Data Set 1996-2013

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
<i>All admissions</i>			
Sample mean	311.8	236.8	1141.3
Full parity law	24	157*	344***
	[-92,140]	[-5,319]	[103,586]
Public insurance (/100)	-39	60	-145
	[-108,31]	[-23,143]	[-359,68]
Observations	639	639	639
<i>Non-criminal justice system admissions</i>			
Sample mean	152.3	104.4	557.2
Full parity law	29	58*	196***
	[-28,87]	[-10,126]	[67,324]
Public insurance (/100)	-12	20	-10
	[-50,25]	[-17,58]	[-130,109]
Observations	639	639	639
<i>Criminal justice system admissions</i>			
Sample mean	159.5	132.4	584.0
Full parity law	-2	84*	161**
	[-74,70]	[-15,183]	[18,305]
Public insurance (/100)	-28	44*	-158***
	[-63,6]	[-3,91]	[-269,-48]
Observations	639	639	639

Notes: Unit of observation is a state-year. Data unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state characteristics, state fixed effects, and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 6A. Effect of insurance expansions on total and coverage admission counts applying population weights: Treatment Episode Data Set 1996-2017

Outcome	Total	Private	Public	No insurance
<i>All admissions</i>				
Sample mean	2657.1	515.0	1060.3	1081.8
Full parity law	559*** [219,899]	120** [5,235]	84 [-225,392]	439** [52,827]
Public insurance (/100)	-507** [-905,-109]	-60 [-164,44]	-298* [-610,14]	-177 [-477,123]
Observations	779	779	779	779
<i>Non-criminal justice system admissions</i>				
Sample mean	1159.8	270.7	478.9	410.2
Full parity law	218*** [74,362]	74** [16,132]	67 [-112,247]	113** [3,223]
Public insurance (/100)	-174** [-346,-2]	-25 [-77,26]	-128 [-287,31]	-34 [-131,63]
Observations	779	779	779	779
<i>Criminal justice system admissions</i>				
Sample mean	1497.3	244.2	581.4	671.7
Full parity law	317** [67,567]	58* [-9,126]	5 [-143,154]	327** [30,624]
Public insurance (/100)	-332** [-605,-58]	-37 [-98,25]	-160** [-313,-8]	-149 [-362,63]
Observations	779	779	779	779

Notes: Unit of observation is a state-year. Data are weighted by the state population ages 12 to 17 years. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state fixed effects and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 6B. Effect of insurance expansions on admission counts by treatment setting applying population weights: Treatment Episode Data Set 1996-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
<i>All admissions</i>			
Sample mean	615.9	379.7	1661.4
Full parity law	16	282**	282**
	[-98,130]	[29,536]	[44,521]
Public insurance (/100)	-126*	43	-519***
	[-255,3]	[-44,130]	[-831,-208]
Observations	779	779	779
<i>Non-criminal justice system admissions</i>			
Sample mean	264.9	152.4	742.5
Full parity law	39**	84**	114**
	[4,75]	[1,166]	[14,213]
Public insurance (/100)	-55	8	-168**
	[-122,12]	[-32,47]	[-303,-34]
Observations	779	779	779
<i>Criminal justice system admissions</i>			
Sample mean	351.0	227.4	918.9
Full parity law	-10	173**	155
	[-109,90]	[2,344]	[-35,344]
Public insurance (/100)	-69*	47	-347***
	[-140,2]	[-12,105]	[-574,-120]
Observations	779	779	779

Notes: Unit of observation is a state-year. Data are weighted by the state population ages 12 to 17 years. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state fixed effects and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.
 ***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 7A. Effect of insurance expansions on total and coverage admissions per 100,000 children 12 to 17 years using least squares: Treatment Episode Data Set 1996-2017

Outcome	Total	Private	Public	No insurance
<i>All admissions</i>				
Sample mean	478.1	113.8	212.6	151.7
Full parity law	131**	59*	89	-17
	[13,249]	[-6,123]	[-69,247]	[-166,133]
Public insurance (/100)	38	5	47	-14
	[-76,153]	[-38,49]	[-33,127]	[-92,65]
Observations	779	779	779	779
<i>Non-criminal justice system admissions</i>				
Sample mean	247.2	68.5	109.9	68.8
Full parity law	97***	40**	51	6
	[29,165]	[1,78]	[-29,132]	[-69,80]
Public insurance (/100)	51	13	44*	-6
	[-29,130]	[-21,47]	[-6,94]	[-41,28]
Observations	779	779	779	779
<i>Criminal justice system admissions</i>				
Sample mean	230.9	45.3	102.7	82.9
Full parity law	34	19	37	-22
	[-40,108]	[-9,47]	[-49,123]	[-106,61]
Public insurance (/100)	-12	-8	3	-7
	[-70,45]	[-27,12]	[-41,46]	[-54,40]
Observations	779	779	779	779

Notes: Unit of observation is a state-year. Outcome variables are rates per 100,000 children 12 to 17 years. Data are unweighted. All models estimated with least squares and control for state characteristics, state fixed effects, and year fixed effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 7B. Effect of insurance expansions on admissions by treatment setting per 100,000 children 12 to 17 years using least squares: Treatment Episode Data Set 1996-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
<i>All admissions</i>			
Sample mean	77.0	69.3	331.8
Full parity law	-1	29	103*
	[-45,43]	[-10,68]	[-0,206]
Public insurance (/100)	-1	37**	3
	[-22,20]	[4,71]	[-95,100]
Observations	779	779	779
<i>Non-criminal justice system admissions</i>			
Sample mean	42.1	32.3	172.8
Full parity law	5	18**	74**
	[-16,25]	[3,33]	[17,132]
Public insurance (/100)	4	18**	29
	[-8,16]	[3,34]	[-40,97]
Observations	779	779	779
<i>Criminal justice system admissions</i>			
Sample mean	34.9	37.1	158.9
Full parity law	-6	11	28
	[-32,21]	[-17,40]	[-35,91]
Public insurance (/100)	-6	19*	-26
	[-17,6]	[-3,41]	[-73,21]
Observations	779	779	779

Notes: Unit of observation is a state-year. Outcome variables are rates per 100,000 children 12 to 17 years. Data are unweighted. All models estimated with least squares and control for state characteristics, state fixed effects, and year fixed effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, *=statistically different from zero at the 1%,5%,10% level.

Appendix Table 8A. Effect of insurance expansions on total and coverage admission counts excluding Maryland: Treatment Episode Data Set 1996-2017

Outcome	Total	Private	Public	No insurance
<i>All admissions</i>				
Sample mean	1433.5	294.4	610.8	528.3
Full parity law	362*** [148,575]	74** [0,148]	213* [-30,456]	149** [1,297]
Public insurance (/100)	-63 [-318,192]	5 [-61,71]	-38 [-227,152]	-46 [-160,69]
Observations	757	757	757	757
<i>Non-criminal justice system admissions</i>				
Sample mean	690.7	164.6	302.7	223.5
Full parity law	204*** [79,330]	55** [9,100]	145** [4,285]	44* [-7,95]
Public insurance (/100)	10 [-129,150]	10 [-26,47]	3 [-96,101]	-12 [-65,42]
Observations	757	757	757	757
<i>Criminal justice system admissions</i>				
Sample mean	742.7	129.8	308.1	304.8
Full parity law	172*** [51,293]	30 [-6,66]	73 [-38,183]	106** [1,211]
Public insurance (/100)	-84 [-215,48]	-11 [-47,26]	-45 [-139,50]	-33 [-101,35]
Observations	757	757	757	757

Notes: Unit of observation is a state-year. Data are weighted by the state population 12 to 17 years of age. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) control for state characteristics, state fixed effects, and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 8B. Effect of insurance expansions on admission counts by treatment setting excluding Maryland: Treatment Episode Data Set 1996-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
<i>All admissions</i>			
Sample mean	267.2	206.3	960.0
Full parity law	15	156**	252***
	[-59,89]	[11,301]	[96,407]
Public insurance (/100)	-39	54	-106
	[-113,35]	[-11,120]	[-316,104]
Observations	757	757	757
<i>Non-criminal justice system admissions</i>			
Sample mean	127.4	91.1	472.2
Full parity law	29	61**	156***
	[-8,66]	[3,119]	[61,250]
Public insurance (/100)	-14	20	-8
	[-50,22]	[-10,50]	[-122,106]
Observations	757	757	757
<i>Criminal justice system admissions</i>			
Sample mean	139.8	115.2	487.8
Full parity law	-12	85*	120**
	[-61,37]	[-2,172]	[25,214]
Public insurance (/100)	-25	39**	-116**
	[-63,13]	[0,77]	[-221,-11]
Observations	757	757	757

Notes: Unit of observation is a state-year. Data are weighted by the state population 12 to 17 years of age. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state characteristics, state fixed effects, and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets. ***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 9A. Effect of insurance expansions on total and coverage admission counts excluding treatment states that transitions from no law regulating SUD treatment in private markets to full parity: Treatment Episode Data Set 1996-2017

Outcome	Total	Private	Public	No insurance
<i>All admissions</i>				
Sample mean	1490.6	304.6	635.6	550.4
Full parity law	384*** [154,615]	76* [-4,157]	225* [-36,486]	164** [8,320]
Public insurance (/100)	-37 [-306,232]	10 [-60,80]	-26 [-228,176]	-30 [-148,87]
Observations	719	719	719	719
<i>Non-criminal justice system admissions</i>				
Sample mean	712.9	169.2	313.4	230.3
Full parity law	200*** [61,338]	52** [4,101]	143* [-10,295]	46 [-9,102]
Public insurance (/100)	28 [-118,175]	13 [-26,52]	7 [-98,111]	3 [-47,54]
Observations	719	719	719	719
<i>Criminal justice system admissions</i>				
Sample mean	777.7	135.4	322.2	320.1
Full parity law	191*** [67,315]	34* [-5,72]	85 [-34,203]	113** [3,222]
Public insurance (/100)	-75 [-213,62]	-9 [-48,30]	-36 [-137,65]	-34 [-106,38]
Observations	719	719	719	719

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state characteristics, state fixed effects, and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.
***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 9B. Effect of insurance expansions on admission counts by treatment setting excluding treatment states that transitions from no law regulating SUD treatment in private markets to full parity: Treatment Episode Data Set 1996-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
<i>All admissions</i>			
Sample mean	279.5	213.3	997.8
Full parity law	16	164**	272***
	[-62,94]	[8,321]	[105,439]
Public insurance (/100)	-40	62*	-86
	[-118,38]	[-8,131]	[-308,137]
Observations	719	719	719
<i>Non-criminal justice system admissions</i>			
Sample mean	132.7	92.8	487.5
Full parity law	29	62*	152***
	[-10,69]	[-4,128]	[50,255]
Public insurance (/100)	-14	25	7
	[-52,24]	[-8,57]	[-115,128]
Observations	719	719	719
<i>Criminal justice system admissions</i>			
Sample mean	146.8	120.6	510.3
Full parity law	-12	90*	138***
	[-64,40]	[-2,181]	[41,234]
Public insurance (/100)	-25	42**	-109**
	[-65,14]	[1,82]	[-218,-0]
Observations	719	719	719

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state characteristics, state fixed effects, and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 10A. Effect of insurance expansions on total and coverage admission counts excluding treatment states that transitions from a weaker law regulating SUD treatment in private markets to full parity: Treatment Episode Data Set 1996-2017

Outcome	Total	Private	Public	No insurance
<i>All admissions</i>				
Sample mean	1424.8	347.7	624.0	453.0
Full parity law	-43 [-554,468]	223** [3,442]	-229 [-645,187]	392*** [122,663]
Public insurance (/100)	-5 [-282,271]	35 [-37,106]	-79 [-293,136]	15 [-110,141]
Observations	659	659	659	659
<i>Non-criminal justice system admissions</i>				
Sample mean	724.7	201.7	313.6	209.4
Full parity law	45 [-300,390]	148*** [36,260]	-114 [-352,125]	190*** [77,303]
Public insurance (/100)	33 [-124,190]	29 [-17,74]	-20 [-133,93]	12 [-49,73]
Observations	659	659	659	659
<i>Criminal justice system admissions</i>				
Sample mean	700.1	146.1	310.4	243.6
Full parity law	-103 [-397,191]	80 [-44,203]	-122 [-336,93]	186* [-16,389]
Public insurance (/100)	-52 [-186,83]	0 [-34,34]	-63 [-167,42]	5 [-67,76]
Observations	659	659	659	659

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state characteristics, state fixed effects, and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.
***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 10B. Effect of insurance expansions on admission counts by treatment setting excluding treatment states that transitions from a weaker law regulating SUD treatment in private markets to full parity: Treatment Episode Data Set 1996-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
<i>All admissions</i>			
Sample mean	250.8	212.3	961.7
Full parity law	-33	23	-32
	[-182,116]	[-55,101]	[-434,371]
Public insurance (/100)	-54	46	-9
	[-133,24]	[-26,118]	[-230,211]
Observations	659	659	659
<i>Non-criminal justice system admissions</i>			
Sample mean	133.5	101.6	489.6
Full parity law	-21	28	31
	[-104,61]	[-13,70]	[-241,303]
Public insurance (/100)	-21	15	25
	[-62,20]	[-19,50]	[-99,149]
Observations	659	659	659
<i>Criminal justice system admissions</i>			
Sample mean	117.3	110.7	472.1
Full parity law	2	-18	-61
	[-76,81]	[-62,26]	[-310,189]
Public insurance (/100)	-32	33	-57
	[-73,9]	[-8,74]	[-159,44]
Observations	659	659	659

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state characteristics, state fixed effects, and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 11A. Effect of insurance expansions on total and coverage admission counts: Treatment Episode Data Set 1996-2017

Outcome	Total	Private	Public	No insurance
<i>All admissions</i>				
Sample mean	1539.9	350.1	621.8	568.0
Full parity law	267* [-12,546]	80** [14,146]	156 [-43,354]	142 [-74,358]
Observations	900	900	900	900
<i>Non-criminal justice system admissions</i>				
Sample mean	771.4	203.7	312.0	255.6
Full parity law	105 [-51,262]	53** [13,93]	83 [-55,221]	22 [-67,110]
Observations	900	900	900	900
<i>Criminal justice system admissions</i>				
Sample mean	768.6	146.4	309.7	312.4
Full parity law	149** [2,297]	30* [-2,61]	63* [-12,138]	118* [-17,253]
Observations	900	900	900	900

Notes: Unit of observation is a state-year. Data are weighted by the state population 12 to 17 years of age. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state fixed effects and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 11B. Effect of insurance expansions on admission counts by treatment setting: Treatment Episode Data Set 1992-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
<i>All admissions</i>			
Sample mean	296.9	204.6	1038.4
Full parity law	29 [-38,97]	141** [1,281]	146 [-49,341]
Observations	900	900	900
<i>Non-criminal justice system admissions</i>			
Sample mean	151.3	95.0	525.1
Full parity law	23 [-7,53]	52** [5,100]	51 [-71,173]
Observations	900	900	900
<i>Criminal justice system admissions</i>			
Sample mean	145.6	109.7	513.3
Full parity law	8 [-40,56]	82* [-8,171]	83 [-25,192]
Observations	900	900	900

Notes: Unit of observation is a state-year. Data are weighted by the state population 12 to 17 years of age. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for state fixed effects and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 12A. Effect of a private insurance full parity law on total and coverage admission counts using a dynamic model using all admissions: Treatment Episode Data Set 1996-2017

Outcome	Total	Private	Public	No insurance
Sample mean	1533.7	339.5	656.3	538.0
-5 years (omitted period)	--	--	--	--
-4 years	-28 [-213,158]	35 [-74,145]	97 [-69,262]	-70 [-243,104]
-3 years	-74 [-488,340]	27 [-94,148]	67 [-295,430]	-71 [-312,170]
-2 years	54 [-345,453]	74 [-45,193]	88 [-282,458]	-4 [-228,220]
-1 year	356* [-14,726]	87 [-50,224]	274** [7,542]	102 [-146,350]
Law passage year	435** [91,778]	102 [-31,234]	241 [-77,559]	239* [-42,520]
+1 year	414* [-18,846]	193** [46,340]	246 [-242,734]	185 [-146,515]
+2 years	457** [67,846]	202** [48,357]	353 [-208,914]	139 [-195,473]
+3 years	205 [-257,666]	137** [30,243]	203 [-371,777]	91 [-256,438]
+4 years	332 [-69,732]	100 [-26,225]	274 [-309,858]	195 [-204,593]
+5 year	310 [-395,1016]	108 [-73,288]	252 [-536,1040]	288 [-221,797]
Observations	779	779	779	779

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for a public insurance, state characteristics, state fixed effects and year fixed effects. The indicator for -5 years includes all state-year observations that are five or more years prior to passage of the parity law. The indicator for +5 years includes all state-year observations that are five or more years after passage of the parity law. All states that do not adopt a parity law are coded as zero for all event-time indicators. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 12B. Effect of a private insurance full parity law on total and coverage admission counts using a dynamic model using non-criminal justice system admissions: Treatment Episode Data Set 1996-2017

Outcome	Total	Private	Public	No insurance
Sample mean	741.3	190.3	322.4	228.6
-5 years (omitted period)	--	--	--	--
-4 years	-60 [-194,73]	23 [-51,97]	21 [-67,109]	-66 [-164,33]
-3 years	-44 [-291,203]	21 [-56,99]	12 [-185,209]	-33 [-168,102]
-2 years	-5 [-235,224]	39 [-32,110]	25 [-177,228]	-19 [-142,103]
-1 year	163* [-25,351]	58 [-26,143]	135* [-24,294]	21 [-112,153]
Law passage year	175* [-6,356]	60 [-30,149]	113 [-62,288]	71 [-50,191]
+1 year	195 [-51,441]	128*** [44,213]	119 [-173,411]	39 [-115,193]
+2 years	220** [14,426]	141*** [51,230]	161 [-155,476]	25 [-143,192]
+3 years	116 [-116,348]	97*** [29,166]	110 [-209,428]	9 [-156,175]
+4 years	145 [-100,391]	86*** [21,150]	129 [-200,459]	34 [-153,222]
+5 year	134 [-213,481]	103** [4,203]	112 [-311,534]	82 [-129,293]
Observations	779	779	779	779

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for a public insurance, state characteristics, state fixed effects and year fixed effects. The indicator for -5 years includes all state-year observations that are five or more years prior to passage of the parity law. The indicator for +5 years includes all state-year observations that are five or more years after passage of the parity law. All states that do not adopt a parity law are coded as zero for all event-time indicators. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 12C. Effect of a private insurance full parity law on total and coverage admission counts using a dynamic model using criminal justice system admissions: Treatment Episode Data Set 1996-2017

Outcome	Total	Private	Public	No insurance
Sample mean	792.5	149.2	333.9	309.4
-5 years (omitted period)	--	--	--	--
-4 years	18 [-82,118]	6 [-37,49]	68 [-32,168]	-12 [-100,77]
-3 years	-37 [-241,167]	4 [-49,56]	43 [-132,219]	-41 [-167,85]
-2 years	46 [-156,249]	31 [-29,90]	49 [-124,222]	12 [-110,133]
-1 year	190* [-25,404]	33 [-23,89]	126** [8,244]	79 [-57,214]
Law passage year	247** [48,447]	45 [-10,100]	116 [-38,271]	159* [-12,331]
+1 year	211* [-24,445]	71** [4,138]	109 [-101,318]	142 [-48,333]
+2 years	242** [13,470]	78** [7,148]	180 [-79,438]	110 [-71,291]
+3 years	87 [-196,371]	49** [1,98]	80 [-185,345]	73 [-124,270]
+4 years	188 [-41,417]	25 [-38,88]	137 [-128,402]	161 [-66,388]
+5 year	189 [-212,591]	25 [-54,103]	134 [-236,504]	190 [-119,500]
Observations	779	779	779	779

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for a public insurance, state characteristics, state fixed effects and year fixed effects. The indicator for -5 years includes all state-year observations that are five or more years prior to passage of the parity law. The indicator for +5 years includes all state-year observations that are five or more years after passage of the parity law. All states that do not adopt a parity law are coded as zero for all event-time indicators. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 13A. Effect of a private insurance full parity law on admission counts by treatment setting using a dynamic model using all admissions: Treatment Episode Data Set 1996-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
Sample mean	285.2	218.2	1030.3
-5 years (omitted period)	--	--	--
-4 years	51 [-19,120]	12 [-46,70]	-108 [-253,37]
-3 years	12 [-71,94]	24 [-73,122]	-114 [-421,192]
-2 years	16 [-87,118]	30 [-77,138]	28 [-264,319]
-1 year	13 [-90,117]	55 [-34,145]	307* [-0,614]
Law passage year	-8 [-135,119]	154*** [42,265]	326*** [79,573]
+1 year	42 [-64,148]	166** [3,329]	227 [-76,530]
+2 years	90 [-32,211]	165* [-16,346]	241** [15,468]
+3 years	11 [-137,159]	148* [-11,307]	99 [-225,424]
+4 years	48 [-123,218]	58 [-174,290]	316 [-96,728]
+5 year	11 [-236,257]	36 [-222,293]	342 [-242,926]
Observations	779	779	779

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for a public insurance, state characteristics, state fixed effects and year fixed effects. The indicator for -5 years includes all state-year observations that are five or more years prior to passage of the parity law. The indicator for +5 years includes all state-year observations that are five or more years after passage of the parity law. All states that do not adopt a parity law are coded as zero for all event-time indicators. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, *=statistically different from zero at the 1%,5%,10% level.

Appendix Table 13B. Effect of a private insurance full parity law on admission counts by treatment setting using a dynamic model using all non-criminal justice system admissions: Treatment Episode Data Set 1996-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
Sample mean	139.7	98.1	503.4
-5 years (omitted period)	--	--	--
-4 years	-8 [-44,29]	-20 [-56,17]	-41 [-145,64]
-3 years	-4 [-47,39]	-6 [-55,42]	-29 [-215,157]
-2 years	-16 [-71,40]	13 [-37,62]	18 [-161,196]
-1 year	10 [-42,61]	27 [-13,67]	140* [-18,298]
Law passage year	-5 [-75,65]	45** [8,81]	160** [16,304]
+1 year	32 [-18,83]	56* [-7,120]	125 [-66,317]
+2 years	39 [-16,94]	64* [-9,137]	155** [15,295]
+3 years	6 [-72,85]	55 [-12,122]	102 [-74,278]
+4 years	5 [-79,88]	26 [-75,126]	176 [-44,395]
+5 year	-5 [-119,109]	14 [-92,121]	184 [-83,451]
Observations	779	779	779

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for a public insurance, state characteristics, state fixed effects and year fixed effects. The indicator for -5 years includes all state-year observations that are five or more years prior to passage of the parity law. The indicator for +5 years includes all state-year observations that are five or more years after passage of the parity law. All states that do not adopt a parity law are coded as zero for all event-time indicators. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 13C. Effect of a private insurance full parity law on admission counts by treatment setting using a dynamic model using criminal justice system admissions: Treatment Episode Data Set 1996-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
Sample mean	145.5	120.1	526.8
-5 years (omitted period)	--	--	--
-4 years	52** [11,93]	22 [-10,54]	-71 [-157,15]
-3 years	14 [-31,59]	25 [-33,83]	-85 [-245,75]
-2 years	26 [-30,83]	14 [-52,79]	7 [-147,160]
-1 year	8 [-53,69]	24 [-33,81]	168* [-11,347]
Law passage year	-1 [-65,64]	94** [20,168]	172** [34,310]
+1 year	14 [-54,81]	98* [-1,196]	108 [-52,268]
+2 years	52 [-34,138]	88 [-22,197]	107 [-26,241]
+3 years	4 [-81,89]	74 [-21,169]	16 [-200,232]
+4 years	43 [-55,141]	17 [-139,172]	155 [-98,408]
+5 year	21 [-116,159]	13 [-146,173]	176 [-175,527]
Observations	779	779	779

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for a public insurance, state characteristics, state fixed effects and year fixed effects. The indicator for -5 years includes all state-year observations that are five or more years prior to passage of the parity law. The indicator for +5 years includes all state-year observations that are five or more years after passage of the parity law. All states that do not adopt a parity law are coded as zero for all event-time indicators. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 14A. Effect of public insurance expansions on total and coverage admission counts using a dynamic model: Treatment Episode Data Set 1997-2017

Outcome	Total	Private	Public	No insurance
<i>All admissions</i>				
Sample mean	1523.9	333.1	664.6	526.1
Public insurance (/100) (one year lead)	-177 [-429,75]	-15 [-79,48]	-79 [-253,95]	-98 [-217,20]
Public insurance (/100) (contemporaneous)	-0 [-114,113]	1 [-35,36]	-24 [-116,68]	-19 [-81,43]
Public insurance (/100) (one year lag)	45 [-154,245]	0 [-65,65]	13 [-103,128]	69 [-25,164]
Observations	747	747	747	747
<i>Non-criminal justice system admissions</i>				
Sample mean	732.0	185.1	325.1	221.8
Public insurance (/100) (one year lead)	-41 [-181,99]	-3 [-40,35]	-13 [-108,82]	-37 [-92,17]
Public insurance (/100) (contemporaneous)	1 [-63,65]	-1 [-24,22]	-7 [-49,36]	-6 [-33,21]
Public insurance (/100) (one year lag)	41 [-57,139]	11 [-21,44]	8 [-49,65]	37* [-4,78]
Observations	747	747	747	747
<i>Criminal justice system admissions</i>				
Sample mean	791.9	148.1	339.5	304.4
Public insurance (/100) (one year lead)	-139** [-264,-15]	-18 [-47,11]	-67 [-148,13]	-58 [-127,12]
Public insurance (/100) (contemporaneous)	-2 [-77,73]	0 [-22,23]	-16 [-78,46]	-14 [-64,36]
Public insurance (/100) (one year lag)	-9 [-120,102]	-17 [-56,21]	-2 [-67,64]	31 [-28,90]
Observations	747	747	747	747

Notes: Unit of observation is a state-year. Sample sizes are smaller than the main sample as we lose one year of data through the inclusion of the one year lag (i.e., 1996) as public insurance policy information is only available beginning in 1996. See the text for details. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for a full parity law, state characteristics, state fixed effects and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 14B. Effect of public insurance expansions on admission counts by treatment setting using a dynamic model: Treatment Episode Data Set 1997-2017

Outcome	Residential	Intensive outpatient	Non-intensive outpatient
<i>All admissions</i>			
Sample mean	283.4	219.5	1021.0
Public insurance (/100) (one year lead)	-73* [-160,14]	24 [-32,79]	-120 [-318,78]
Public insurance (/100) (contemporaneous)	-2 [-34,29]	21 [-11,52]	-31 [-140,78]
Public insurance (/100) (one year lag)	14 [-44,73]	36 [-14,86]	-22 [-191,148]
Observations	747	747	747
<i>Non-criminal justice system admissions</i>			
Sample mean	137.8	98.1	496.1
Public insurance (/100) (one year lead)	-26 [-71,18]	3 [-23,30]	-11 [-113,92]
Public insurance (/100) (contemporaneous)	-5 [-21,11]	10 [-5,24]	-7 [-63,50]
Public insurance (/100) (one year lag)	11 [-12,34]	15 [-8,38]	-4 [-82,75]
Observations	747	747	747
<i>Criminal justice system admissions</i>			
Sample mean	145.6	121.4	525.0
Public insurance (/100) (one year lead)	-50** [-96,-4]	24 [-10,58]	-114** [-225,-3]
Public insurance (/100) (contemporaneous)	5 [-21,31]	11 [-9,32]	-29 [-108,49]
Public insurance (/100) (one year lag)	4 [-36,45]	22 [-11,55]	-33 [-135,70]
Observations	747	747	747

Notes: Unit of observation is a state-year. Sample sizes are smaller than the main sample as we lose one year of data through the inclusion of the one year lag (i.e., 1996) as public insurance policy information is only available beginning in 1996. See the text for details. Data are unweighted. All models estimated with a Poisson model (population ages 12 to 17 years as the exposure variable) and control for a full parity law, state characteristics, state fixed effects and year fixed effects. Beta coefficients are converted to average marginal effects. 95% confidence that account for within state clustering are reported in square brackets.

***, **, * = statistically different from zero at the 1%, 5%, 10% level.

Appendix Table 15. Test of covariate balance: 1996-2017

Outcome:	Parity law	Public insurance eligibility
Sample proportion or mean:	0.28	2.09
HIFA Medicaid waiver	0.106 [-0.174,0.386]	-0.013 [-0.390,0.365]
ACA Medicaid expansion	-0.045 [-0.227,0.138]	0.231** [0.047,0.414]
Medical marijuana legalized	-0.047 [-0.154,0.060]	0.058 [-0.114,0.229]
Recreational marijuana legalized	0.042 [-0.139,0.224]	0.011 [-0.159,0.180]
Prescription drug	0.035 [-0.087,0.157]	-0.050 [-0.220,0.119]
Small business share	0.405 [-0.887,1.698]	-0.023 [-2.008,1.961]
Poverty rate	-0.002 [-0.014,0.010]	0.002 [-0.012,0.017]
Unemployment rate	-2.611 [-6.779,1.557]	-1.259 [-5.946,3.428]
Governor Democrat	0.022 [-0.037,0.080]	0.008 [-0.102,0.118]
Age	-0.025 [-0.088,0.037]	-0.024 [-0.111,0.062]
Female	2.457 [-3.405,8.319]	-3.317 [-13.896,7.261]
Hispanic ethnicity	0.481 [-2.611,3.573]	0.404 [-3.818,4.626]
African American	-0.541 [-3.106,2.024]	-1.264 [-4.171,1.643]
Other race	-0.729 [-3.059,1.601]	-1.925 [-4.418,0.568]
High school	1.550 [-1.520,4.621]	-1.381 [-8.267,5.505]
Some college	-0.692 [-3.692,2.309]	-0.773 [-6.475,4.929]
College degree	-0.541 [-4.406,3.323]	0.618 [-4.701,5.936]
Observations	779	779

Notes: Unit of observation is a state-year. Data are unweighted. All models estimated with OLS and control for state characteristics, state fixed effects, and year fixed effects. The omitted categories are male, non-Hispanic ethnicity, white race, and less than high school education. 95% confidence that account for within state clustering are reported in square brackets.

***,**,*=statistically different from zero at the 1%,5%,10% level.

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