MENTAL HEALTH PARITY LEGISLATION, COST-SHARING AND SUBSTANCE ABUSE TREATMENT ADMISSIONS

Dhaval M. Dave
Swati Mukerjee

ABSTRACT

Treatment is highly cost-effective in reducing an individual's substance abuse (SA) and associated harms. However, data from Treatment Episodes (TEDS) indicate that per capita treatment admissions substantially lagged behind increases in heavy drug use from 1992-2007. Only ten percent of individuals with clinical SA disorders receive any treatment, and almost half who forgo treatment point to accessibility and cost constraints as barriers to care. This study investigates the impact of state mental health and SA parity legislation on treatment admission flows and cost-sharing. Fixed effects specifications indicate that mandating comprehensive parity for mental health and SA disorders raises the probability that a treatment admission is privately insured, lowering costs for the individual. Despite some crowd-out of charity care for private insurance, mandates reduce the uninsured probability by a net 2.4 percentage points. States mandating comprehensive parity also see an increase in total treatment admissions. Thus, increasing cost-sharing and reducing financial barriers may aid the at-risk population in obtaining adequate SA treatment. Supply constraints mute effect sizes, suggesting that demand-focused interventions need to be complemented with policies supporting treatment providers. These results have implications for the effectiveness of the 2008 Federal Mental Health Parity and Addiction Equity Act in increasing SA treatment admissions and promoting cost-sharing.

Dhaval M. Dave
Bentley University
Department of Economics
175 Forest Street, AAC 195
Waltham, MA 02452-4705
and NBER
ddave@bentley.edu

Swati Mukerjee
Bentley University
175 Forest Street, AAC 183
Waltham, MA 02452
smukerjee@bentley.edu

1. INTRODUCTION

Of the twenty million individuals with clinical alcohol or drug abuse disorders (collectively known as substance abuse or SA disorders), only ten percent received treatment in the past year, implying that nearly eighteen million went untreated (2007 National Survey of Drug Use and Health - NSDUH). Among those who do not obtain treatment, nearly 50 % point to cost constraints or lack of insurance coverage as impediments to care. Even amongst the privately-insured, almost one out of four cite affordability or non-coverage issues.

Mental illness or SA disorders are not treated at par with physical illness by public and private insurers. The Mental Health Parity Act of 1996, effective from January 1, 1998, addressed this coverage disparity by mandating that group health insurance coverage offered by large employers (with over 50 employees) must cover mental illness equal to the lifetime and annual caps for physical illnesses. This Act, however, did not apply to SA disorders and chemical dependency nor did it fully address unequal coverage since insurers could still set higher co-payments and deductibles with lower treatment limits for mental illnesses. Some of the loopholes have been addressed by the recently enacted Mental Health Parity and Addiction Equity Act of 2008, effective October 3, 2009. Applying to both mental health as well as SA disorders, it mandates parity for all financial requirements (including deductibles, co-payments, coinsurance, and out-of-pocket expenses), treatment limitations (including limits on the frequency of treatment, number of visits, days of coverage, or other limits on treatment scope or duration), and out-of-network benefits of group health plans. More importantly, with continued availability of cost and non-group health plan exemptions, the new law, similar to the 1996 provisions, continues to apply only to policies with existing mental health benefits. Group plans that do not already offer mental health coverage are not required to do so.

To rectify these loopholes several states have legislated more generous provisions. Whether improved access to treatment and reduction of out-of-pocket costs have had a positive impact on the decision to seek treatment depends on how effective the laws have been in facilitating significant cost-sharing and expanding access for individuals in need. This study exploits the substantial state-level differences in both scope and timing of enactment of the parity laws to analyze the impact of such mandates on flows into SA treatment admissions. We also investigate the impact of these laws on cost-sharing by examining how they have affected the probability that a treatment admission is covered by private insurance or is uninsured. With low prevalence of SA treatment and reporting biases, population and household surveys do not provide adequate sample sizes to facilitate rigorous analyses of state or locality-specific policy factors. Spanning 1992 though 2007, this study employs administrative data on almost 26 million treatment admissions from the Treatment Episodes Data Set (TEDS), matched with each state's insurance policy. Fixed-effects specifications account and control for statistical and policy endogeneity as well as unobservables potentially correlated with policies and treatment admissions.

If the comprehensive state mandates are found to be effective, then with only 12 states currently offering full parity, there is considerable scope for policy interventions. The results also have implications for the likely effects of the 2008 Parity Act on substance abuse treatment admissions and insurance coverage.

2. BACKGROUND

An extensive body of literature indicates the effectiveness of drug abuse treatment in reducing drug use and associated harms including adverse health effects, crime, HIV infection, and unemployment, relative to no treatment.[1] For instance, in a large sample of opiate-dependent

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[1] See, for instance, Reuter and Pollack (2006), Stewart et al. (2002), Institute of Medicine (2000), and Metzger (1998).

individuals in Philadelphia, 21 % of treated individuals tested positive for HIV after seven years

versus 51 % in a matched no-treatment group (McLellan et al., 2000). Furthermore, cost-benefit

studies have consistently shown that treatment imparts positive economic returns with benefits

far exceeding costs. Rajkumar and French (1997) conclude, for instance, that conservative

benefits of avoided criminal activity and intangible victimization costs alone outweigh even the

most expensive residential treatment programs. According to California's Drug and Alcohol

Treatment Assessment, a dollar invested in substance abuse treatment yields a return of seven

dollars from reduced health care costs, crime, lost-productivity, and other prevented adverse

consequences (Delaney et al., 2000).

Studies also show that drug abuse treatment may be cost-effective relative to other

alternatives. The cost of treatment (about $12,500 for residential and $3,100 for outpatient

treatment per person-year) is significantly less than the cost of incarceration (about $40,000 per

person-year) (Schneider Institute of Health Policy, 2001). Examination of state-level

expenditures on criminal justice and public health programs (Saffer et al. (2001), yield a cost

saving differential of 30% in the use of treatment relative to the use of enforcement and the

criminal justice system.[2] Rydell et al. (1996) show the cost effectiveness of treatment of heavy

substance users over source country control, interdiction, or domestic enforcement.

Despite this apparent consensus on the cost-effectiveness of drug abuse treatment, a

gradual reallocation of federal funding from demand to supply reduction has been taking place.

(Figure 1). The share of the federal drug control budget for law enforcement, interdiction, and

border control has steadily risen from 47 to 65 % from 1995 through 2009, contrasted to the

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[2] Such comparative studies need cautious interpretation as the various approaches are not necessarily
alternatives. Treatment and criminal justice may be mutually reinforcing. For instance, enforcement
activities affect treatment decisions and treatment referrals sometimes originate in the criminal justice
system through drug courts or alternative sentencing.

decline in funding for treatment programs and treatment research over this period (35 % to 23

%). Prevention activities declined in share from 18 to 12 %.[3]

Concurrently, treatment admissions have failed to keep up with recent increases in

substance abuse. Figure 2 documents the trends for population-adjusted (ages 15+) drug-related

hospital emergency department (ED) visits derived from the Drug Abuse Warning Network

(DAWN) and SA treatment admissions. Contrast the over 35% increase during 1992 through

2002 of total substance-related ED visits with the relatively flat trend in treatment admissions.[4]

Two thirds of all SA treatment admissions cite cocaine, heroin and marijuana as primary,

secondary, or tertiary substances of abuse. Figures 3 and 4 break down the separate trends.

While ED visits related to cocaine and heroin use increased over this same period by about 53 %,

related treatment admissions increased by less than six percent, with a recent downward trend.

Treatment, however, represents a significant cost barrier for substance users. Mental

health and substance abuse parity legislation is aimed at overcoming discrimination against those

with mental illnesses as well as reducing out-of-pocket expenses towards treatment benefits.

Due to the high comorbidity between mental disorders and substance abuse, mental health parity

laws may have a positive externality on SA treatment. Saffer and Dave (2005) show that

individuals diagnosed with a mental illness in their lifetime are three times more likely to be

cocaine users relative to individuals with no mental illnesses. Two-stage models indicate a

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[3] There is a break in the data series in 2001, due to a restructuring of how the federal drug control budget is reported. However, this does not affect broad-based comparisons of the relative shares. Source: Office of National Drug Control Policy, Fiscal Year 2010 Budget Summary.
[4] Trends in drug-related ED visits are presented only until 2002 since a re-design of the DAWN sampling frame makes data from 2003 onwards non-comparable to any of the prior years. Nevertheless, recent DAWN data also suggest an increase in population-adjusted drug-related ED visits (by 5 % between 2004-2006). Part of the growth in drug-related hospital ED visits may be due to an increase in the purity of illicit substances. The steady trend in drug-related ED visits however does not perfectly mimic the trends in drug purity. For instance, the average purity of powder cocaine reached a high in the early to mid-1980s, declined somewhat in the early 1990s, remained stable for the rest of the decade, and has recently shown signs of rising again. Heroin purity increased dramatically from the early 1980s until about 1993, and has remained relative stable since. In contrast, cocaine and heroin-related ED visits have mostly exhibited a steady upward trend over the past 25 years. Some of the increase in ED admissions may also be driven by inexperienced drug users, though generally all age groups share in the rising trend in drug-related ED visits.

causal link from higher prevalence of mental illness to increased substance abuse. Any policy that effectively reduces the cost of psychiatric treatment may therefore have a positive impact on SA treatment.[5]

Evidence on the effectiveness of mental health parity legislation, however, is mixed. Studies have only considered the impact of such legislation on mental health services utilization and not on outcomes related to SA treatment. Whereas McGuire and Montgomery (1982) and Frank (1985) find an increased utilization of psychiatric services, recent studies offer mixed evidence. A SAMHSA report studied the experience of two insurers (Blue Cross/Blue Shield - BCBS and Kaiser/Community Health Plan) covering 80 % of Vermont's privately insured population, subsequent to the state's parity law taking effect on January 1, 1998 (Hausman, 2003). Parity significantly increased the likelihood of insured individuals receiving mental health treatment, on the order of 18 to 24 %; there was also a rise in outpatient visits per use.[6] Using state level data, Klick and Markowitz (2006) conclude that mental health mandates are ineffective in reducing suicide rates. Based on individual-level data from the Healthcare for Communities survey, Pacula and Sturm (2000) find that such legislation has not significantly increased utilization of mental health services, though they surmise that this may be due to insurance displacement for high-risk individuals.

Underscoring the limited scope of the 1996 federal law and its various exemptions, several studies show the state mandates have had limited or no effect on employees. For instance, Gruber (1994) shows that state mandates for certain health services including substance

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[5] This characterization of the substance user as being responsive to incentives and variations in costs and benefits is borne out in the literature. Studies have shown that drug consumption does respond negatively to monetary prices and the probability of arrest (Grossman et al. 2002, Dave 2006). Saffer and Dave (2005) analyzed the demand for addictive substances among individuals with mental disorders, a sub-population that may be most likely to abstain from rational decision-making. However, their study further confirms that even mentally-ill individuals cut back on their alcohol use, cigarette smoking, and cocaine use when monetary prices rise. Also see Becker, Grossman, and Murphy (1991) for an analysis of the drug user as a rational, lifetime utility maximizing agent.

[6] However, costs of providing mental health and substance abuse treatment increased only from 2.3 % of spending for all services to 2.47 % for BCBS. Other studies have also shown that a popular argument against enacting such laws, namely an increase in health care costs, remains unfounded (Sturm et al., 1999).

abuse and mental illness, by often being lower than existing benefits, have no impact on the

probability of coverage for an employee of a small firm. In fact, state mandates to cover alcohol

treatment may lower the probability that a small firm offers insurance. Consistent with this

explanation, the Substance Abuse and Mental Health Services Administration (SAMHSA 1999)

reported that almost half of all eligible employers were already compliant with the federal

Mental Health Parity Act of 1996 prior to becoming effective, and 68 % of the plans witnessed

no change in benefits.

That evidence on the effects of insurance mandates on mental health services utilization

is mixed is not to say that substance abuse and mental health treatment do not respond to prices

or cost-sharing. Goodman et al. (1999) analyze an insurance claims database from self-insured

employers and find that, conditional on treatment, substance abuse and mental health treatment

respond to the price of care. Their results show that the magnitude of the price elasticity is

directly related to the co-insurance rate.

Thus the answer to the still open question on the effect of mental health parity laws on

SA treatment admissions may hinge on whether the laws effectively expand access for

individuals in need and facilitate significant cost-sharing. We are not aware of any large-scale,

nationally-representative studies which have directly examined the link between mental health /

substance abuse parity legislation and flows into treatment admissions and payment source of the

admissions.

3.   DATA

3.1 Treatment Episode Data Set (TEDS)

The empirical work is based on substance abuse treatment admission flows derived from

the Treatment Episode Data Set (TEDS). TEDS is an administrative data system designed to

collect information on the number and characteristics of treatment admissions into private and

public facilities receiving any public funding (including state agency funding and federal block grants). Data are collected by substance abuse agencies during the treatment intake interview with the client, and then forwarded to SAMHSA for processing. TEDS covers about 85 % of total admissions to eligible providers, which represents about 67 % of the entire population of treatment admissions to all known providers.[7] Due to the difficulties in obtaining data, states generally do not report information from purely private facilities that do not receive any state or public funds.[8] Thus, while TEDS is not expected to represent a random subset of the *entire* population of treatment admissions, the population captured by TEDS is more likely to be low-income and low-education and is also more likely to be confronted with accessibility and cost-sharing issues relative to treatment admissions in purely private facilities.

We employ data from 1992 to 2007 and restrict the analysis to clients who are 18 years of age and older, resulting in 25,742,103 SA treatment admission records. For each admission, primary, secondary, and tertiary substances of abuse are observed along with client demographics, source of referral, prior history, insurance status, and payment source.[9] In 2007, alcohol was the most prevalent primary substance of abuse among admissions (42.2 %), followed by heroin (14.6 %), cocaine (13.9 %) and marijuana (12 %).

Table 1 presents the demographic composition of treatment admissions and drug use between 1992 and 2007. Data for drug consumption are based on self-reported past year illicit drug use and recoded illicit drug or alcohol abuse or dependence from the National Household

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[7] About 58 % of all treatment facilities are privately-operated but non-profit, about 29 % are private for-profit, and the remainder are operated by the state, local or federal government (National Survey of Substance Abuse Treatment Services, 2007). About 81 % of SA treatment admissions occur in TEDS-eligible facilities, with the remainder occurring in purely private facilities.

[8] The scope of facilities included in TEDS is affected by state-level differences in licensure, certification, and accreditation practices, and disbursement of public funds. For example, some state SA agencies regulate private facilities and individual practitioners, while others do not. To account for any such state-level variations, all models control for state fixed effects and a vector of state-level factors related to mental health, drug use, health care spending, and public funding of SA treatment.

[9] Information on client insurance status and actual payment source, asked in 40 states over the sample period, is available from the TEDS supplemental module. There are no systematic differences in admission characteristics between these 40 states and the full sample.

Survey of Drug Abuse (NHSDA).[10]   Admissions are predominantly male and White with a

slight decline in the former between 1992 and 2007 suggestive of an increase in illicit drug use

among females. Despite a decrease in past year illicit drug use, treatment admissions amongst

Whites increased from 61.8 to 65.3 %. Blacks' share of treatment admissions declined from 27.2

to 21.4 % coinciding with a small decrease in their past year usage. There is also a rise in

treatment admissions of young adults, older adults and those with high school degrees and above,

even as they have increased illicit drug use over this period.

Among past year drug users, the vast majority (64-67 %) were privately insured.

Compare this to SA treatment admissions, in which only about 5.3 % of clients had private

health insurance in 2007, with this share having declined from 9.5 % in 1992. In contrast, the

share of admissions with public insurance (Medicaid or Medicare) increased from 19 to 27 %

possibly reflecting in part the expansions in general Medicaid eligibility that occurred in the

early to mid-1990s.

Being privately insured does not necessarily mean that the client's treatment services are

covered by insurance. In 2007, about 22 % of privately-insured individuals reported in the

NHSDA that they did not receive treatment due to affordability issues or because it was not

covered. Among privately insured clients in TEDS, 44 % paid mostly out-of-pocket

(presumably because their plans do not offer commensurate coverage of SA treatment services);

this share has almost doubled since 1992 (22.3 %). Private insurance covered treatment services

only 34 % of the time (down from 66 % in 1992). Thus, there are two noteworthy trends: first is

the decline in private insurance status among treatment admissions, and second is the decline in

coverage of treatment services conditional on insurance.[11]

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[10] A redesigned sampling frame for the NHSDA in 2002 and 2003 makes earlier years non-comparable to periods post-2002. Thus, prevalence rates are presented for 1992 and 2001.
[11] There has also been a slight decline in self-referrals and an increase in referrals from criminal justice sources. The decline in self-referrals may be indicative of payment and cost constraints. Even though self-referrals declined, a

There has also been a suggestive increase in supply constraints over the past 16 years. Both the number of facilities offering SA treatment as well the number of admissions per capita have remained relatively flat. The mean waiting period between request for service and actual admission (or first provision of clinical service) increased from about 5.5 to 7 days. While the majority of clients enter treatment with no waiting time, this share has also declined from its peak of 73 % to 64 % over the past decade. These disparities suggest unequal propensity in seeking and obtaining treatment, partly related to cost and supply constraints.

3.2 Data Linked to TEDS

We matched the TEDS admission records to several additional variables based on year and state where the admission took place. The supplementary data include information on mental health parity laws, illicit drug-related arrests, suicide mortality, health care and Medicaid spending, welfare reform legislation, and other state-level socio-economic conditions.

Legislation regarding mental health parity laws is derived from the National Conference of State Legislatures database on State Laws Mandating or Regulating Mental Health.[12] Three dichotomous indicators capture a state's legislation status regarding mandating broad, limited, or weak insurance parity for the treatment of mental health disorders. The first indicator of broad parity relates to states which mandate comprehensive parity for the treatment of mental illnesses with few or no exceptions. These states require insurers to provide, as for physical illness, the same level of benefits for a broad range of mental health conditions, including substance abuse disorders and chemical dependency. These benefits include inpatient and outpatient visit limits, co-payments, deductibles, and annual and lifetime limits. The laws apply to group health plans in all cases, and to most individual health plans. As of 2007, only twelve states had legislated

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greater portion of self-referrals was insured in 2007 versus 1992 suggesting a significant selection relating to cost-constraints and health coverage in terms of who seeks treatment.

[12] See http://www.ncsl.org/ and Rickert and Ro (2003)

such broad parity compared to no states in 1992.[13] The second measure reflects states

mandating limited mental health benefits where parity only applies to certain groups (ex: those

with severe biologically-based mental illness or state and local employees). In addition, some of

these states only require employers to offer parity in one of their health plans (mandated

offering) or require parity only if the plan already offers any type of mental health service

(mandated if offered). Other states mandate a minimum benefit that is less than equal to that for

physical illnesses. In addition, parity laws in many of these states do not apply to substance

abuse disorders. In 2007, 36 states plus D.C. mandated such parity with exceptions, compared to

17 states in 1992. None of these states requires group health insurers to provide both mental

health as well as SA benefits with full parity. The third group, which comprises the reference

group in all specifications, includes states for which parity legislation is either non-existent or

fraught with exceptions; for those states that do have some legislation, parity does not extend to

substance abuse disorders or chemical dependency and also does not apply to group health plans

(which comprise the vast majority of the insured in the U.S.). In 1992, there were 33 states and

D.C. with non-existent or weak mental health parity (hereby denoted as weak parity). By 2007,

only 2 states remained (ID and WY). Figure 5 shows the progression of states from weak to

limited to broad parity over the sample period. We exploit this substantial variation in the scope

and timing of enactment of the state laws to identify their impact on treatment admission flows

and cost-sharing.

To separate out the effect of insurance parity legislation from other shifts in state funding,

models control for block grants for state substance abuse treatment and prevention.[14] Another

concurrent policy shift that occurred during the 1990s related to welfare reform. To account for

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[13] The states with broad mental health parity in 2007 are: AR, CT, IN, ME, MD, MN, NC, OR, RI, VT, VA, and WV.

[14] These are funds appropriated by Congress for use by states, and account for about 40% of public funds spent on prevention and treatment in the states.

welfare reform, we construct an indicator, based on the characterization in the 1997 report by the Council of Economic Advisors (CEA, 1997; U.S. Department of Health and Human Services, 1999), for the fraction of time period *t* that a given state had a waiver in place that substantially altered the nature of its Aid to Families with Dependent Children (AFDC) program.[15] We also define a similar indicator for whether a given state had implemented changes to its welfare policies under Temporary Aid to Needy Families (TANF). Finally, in addition to capturing the timing of welfare reform, we also include welfare caseloads in each state as a proxy for the reform. Since the parity indicators are measured at the state level, additional locality-specific socioeconomic and policy variables are included in models to capture time-varying trends within states. Table 2 describes these measures and presents means for all analysis variables for the sample period (1992-2007).

4. ANALYTICAL FRAMEWORK

Since addictive substances are ultimately consumer goods, the analysis can be framed within the context of consumer theory. The probability that a given substance user would seek treatment is a function of the discounted net benefits of treatment. It would be cost-effective for an individual to undergo SA treatment if lifetime benefits exceeded the lifetime costs. Cost-sharing through insurance would lower the cost of seeking treatment and make treatment a more attractive option for substance users, ceteris paribus. Thus, health insurance parity laws, by mandating full mental health and SA parity, may expand the coverage of substance abuse treatment and lower out-of-pocket costs to the individual.

In studying the effects of state parity legislation on SA treatment admissions, we proceed in two steps. First, we investigate whether the enactment of insurance parity increased the number of treatment admissions in the state. While we estimate models for the total number of

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[15] For instance, NJ implemented a major AFDC waiver on October 1, 1992. Thus, the indicator for AFDC waiver for NJ takes on a value of 0.25 for 1992, reflecting the three months in that year that the waiver was in effect.

SA treatment admissions as a baseline comparison, we mainly focus on treatment admissions that are self or privately-referred (the latter also including referral through a health-care provider or an employer) for two reasons.[16] First, this focus is more consistent with consumer choice framework which explicitly assumes that it is the consumer who makes the decision to seek treatment based on cost-benefit calculus. Second, changes in insurance policy are a demand-driven intervention and in general applicable to individuals on the margin of seeking treatment; by affecting out-of-pocket payments for treatment services, parity legislation would presumably impact an individual's propensity to seek treatment. As a result of this rational choice, self-referrals are likely to be most sensitive to insurance changes and will therefore capture an upper-bound effect of insurance legislation on SA treatment admissions.

(1) $\quad T_{st} = E_{st} \, exp \, (\lambda_0 + \lambda_1 L_{st} + Z_{st} \, \Omega + \upsilon_s + \tau_t + \omega_{st})$

Equation (1) posits that the total number of SA treatment admissions for state s in year t is a function of parity laws (L), a vector of state-varying characteristics such as economic conditions and SA-related funding (Z), and a stochastic disturbance (ω). All specifications control for state (υ) and year (τ) fixed effects, which account for unobserved time-invariant state heterogeneity and overall trends. We estimate this specification using a Poisson regression model for two reasons. First, the discrete nature of the outcome variable as a count of admissions makes the Poisson probability distribution especially suitable. Second, the Poisson framework does not suffer from the "incidental parameters" problem and can accommodate fixed effects well (Cameron and Trivedi, 1998). Since the Poisson framework implicitly assumes that the mean of each count (for state s and year t) is equal to its variance, we adjust all standard errors for over-

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[16] We are grateful to an anonymous reviewer for highlighting this point.

dispersion as described in Wooldridge (2001). Exposure for each unit is represented by E_{st}, which can be proxied by state population.[17]

Estimates from equation (1) will inform on whether comprehensive SA treatment parity increases flows into treatment facilities. Since such state legislation is hypothesized to work through cost-sharing and coverage of SA and mental health treatment, we further investigate whether the parity mandates affected the probability that a treatment admission is insured versus uninsured.

$$(2) \quad \text{Prob}(C_{ist} = 1) = \Phi(\beta_0 + \beta_1 L_{st} + X_{ist}\,\Gamma + Z_{st}\,\Pi + \upsilon_s + \tau_t + \varepsilon_{ist})$$

In the above specification, C represents a coverage indicator for whether the ith SA treatment admission, in state s and year t, is privately-insured (and in alternative models, uninsured or publicly insured). Equation (2) postulates that this insurance status is a function of state regulations regarding mental health parity (L), a vector of admission-specific characteristics such as the client's demographic measures, type of admission, and service setting (X), a vector of state-specific factors including the total number of treatment admissions, economic conditions, and SA treatment funding (Z), and a stochastic admission-specific disturbance (ε). Unmeasured time-invariant, state-specific characteristics (υ) and overall trends (τ) are accounted for by state and year fixed effects, respectively. The key parameter of interest is β_1, the marginal effect of the state mandate on the insurance status of treatment admissions. Specification 2 is estimated via probit regression with Φ denoting the standard normal distribution.[18]

Specifications (1) and (2) are akin to a difference-in-differences (DD) framework. The effect of policy is estimated by comparing changes in outcomes pre- and post-legislation for

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[17] Specifying state population as the exposure constrains the coefficient of the natural log of population to one in the Poisson framework. We estimate models by including log population as a covariate with its coefficient free-varying since state population may also proxy for the other state differences. Results are robust to both specifications.
[18] Results are not sensitive to estimation via logit regression or linear probability models with heteroscedasticity correction.

states that enacted parity laws over 1992-2007 relative to states that did not enact or change
their laws. This effect is identified only through within-state variation in parity laws over time.

5. RESULTS

5.1 State Parity Legislation and Aggregate SA Treatment Admissions

Table 3 presents estimates of the Poisson model specified in equation (1). The first
specification indicates that broad parity for mental health and SA treatment benefits significantly
affects total flows into SA treatment admissions. Specifically, states which enact broad parity
see a 12.8 % increase in total treatment admissions, relative to the reference group of states with
weak parity. Contrast this to a marginal 4.7% increase for states with limited (far less
comprehensive in scope and accompanied by various exclusions) parity legislation.

Since self-referred individuals with SA are likely to be more motivated to seek treatment
if the services are covered under their health plans, relating parity legislation to the number of
total self-referred admissions in the state is likely to trace the possible role of cost sharing
through which parity legislation can impact treatment admissions. As hypothesized,
specification 2 shows that the marginal effect of broad parity legislation increases substantially
in magnitude, suggesting that such laws increase the number of self-referrals by 23.1 %. Limited
parity has no impact. Specification 3, which broadens individual-initiated treatment to include
admissions referred by a health-care provider or an employer, likewise indicates that broad parity
is associated with a 20.7 % increase in such admissions while limited parity shows no effect.

Specification 4 considers SA treatment admissions referred through the criminal justice
system. Since these admissions are more likely to reflect coercion or mandatory diversion of
non-violent drug offenders into treatment, we would not expect insurance parity laws to have any
significant impact. The results reassuringly confirm this hypothesis. While these estimates are
insignificant, the non-zero magnitudes may pick up any residual effect of unobserved state-

varying factors. Thus, criminal-justice admissions may be utilized as a further control group to purge the effect of unobservables from the estimated effects for self-referred or privately-referred admissions. Table 3, which presents these as the difference-in-difference-in-differences (DDD) estimates, suggest that broad mental health parity has increased self-referred and privately-referred admissions between 11-14 %.[19] The DDD estimates confirm that limited parity laws have no significant effect on any measure of SA treatment admissions.[20]

It should be noted that the reported effect magnitudes of the parity legislation are not sizeable since they represent the impact of a 100 % increase in the probability of enacting broad parity, which is about 3.3 times the observed standard deviation in these laws. Thus, a one standard deviation increase in the probability of enacting broad parity would raise self-referred admissions by about 4.2 %.[21]

5.2 Specification Checks

The DDD estimates provide one way to purge the effects of unobservable time-variant state factors. Additional specification checks, that directly control for confounding policy shifts and state-specific socioeconomic measures and which account for policy endogeneity, are presented in Table 3. Panel A presents models for self-referred admissions.

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[19] The DDD estimate is constructed by subtracting the coefficient estimates on criminal justice referrals from corresponding estimates on self and private referrals.

[20] With respect to the demographic covariates, self-referred (criminal justice-referred) SA treatment admissions are quadratic in age, increasing up to age 39 (33) and declining subsequently. States with more self-referred treatment admissions also tend to have higher admissions being female and educated, in contrast to criminal justice-referred admissions which are more likely to be male and low-educated. Both increase with the prevalence of Blacks in total state treatment admissions.

[21] Goodman et al. (1999) estimate an average out-patient treatment demand elasticity of approximately -0.43 and an average inpatient treatment demand elasticity of -1.14 (evaluated at a 50% coinsurance rate), based on a claims database. In their study 25 (50) % of the increased inpatient (outpatient) usage attributable to fractional coinsurance comes from an increased number of users. In TEDS, about 40 % of admissions are inpatient care and the remainder represents outpatient clients. Assuming a mean coinsurance rate for all health services of 20 %, broad mental health parity would reduce an individual's price of treatment by 80 %. Based on the mean price response from Goodman et al., broad parity would increase the number of inpatient and outpatient treatment users by 19.4 %. Our estimates (11.3 - 13.8 %) are plausible in that they about 60-70 % of the calibrated estimate. The conclusion offers some reasons for the muted effects.

A policy shift concurrent with the enactment of 1990s state parity legislation related to welfare reform. Specification 1 controls for whether the state had implemented changes to its welfare policies through major waivers to its AFDC program and through implementation of TANF. In addition, the models control for the total number of welfare recipients in the state, which declined considerably over this period partly due to the welfare reform and partly due to economic conditions (Dave et al., 2008). The latter are captured by the contemporaneous and one-year lags of the state unemployment rate and per capita personal income. Specification 1 also controls for state funding of substance abuse prevention and treatment through federal block grants. The results remain relatively robust suggesting that broad parity increased self-referred admissions by about 15 %, similar to the DDD effect of 14 %.

As some state policies tie funding for special groups (for instance, criminal justice population), capacity constraints may force crowding out of self-referred admissions. This possibility is captured in specification 2, which controls for the total number of criminal justice-referred admissions. Coefficient estimates (not reported) suggest a crowd-out elasticity of -0.12 to -0.26 for self- and privately-referred admissions. The effect magnitude of broad parity legislations is not sensitive to accounting for such crowding out.[22]

Another potential concern relates to policy endogeneity. States which enact comprehensive mental health parity laws may be systematically different from the other states. For instance, Sturm and Pacula (1999) show that states adopting strict parity laws had both lower levels of mental health care utilization and supply constraints. This may explain why mental health parity laws may not have significantly increased utilization in these states (Pacula and Sturm, 2000). We check for systematic baseline differences between states that enact broad parity legislation at some point over the sample period and states that do not, *prior to enactment*.

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[22] This is partially due to the controls for state economic conditions and state welfare policies, which are correlated with criminal-justice referrals. If state economic and welfare measures are excluded, then accounting for criminal justice-referrals does reduce the effect of broad parity on treatment admissions.

While Sturm and Pacula (1999) found that states which adopt stricter mental health parity laws had low levels of mental health care utilization to begin with, we do not find any significant differences between the adopters and the non-adopters with respect to SA treatment admissions prior to the legislation. However, states which adopt broad parity do have somewhat lower health care expenditures per capita (by about 12%) and slightly lower Medicaid expenditures per enrollee (by about 6%), prior to enactment. There are no significant differences with respect to Medicaid enrollment (adjusting for population), arrest rates for drug abuse violations, or suicide mortality rates.

Nevertheless, the decision to enact broad parity may be dependent on states' prior experience with health care spending, drug enforcement, admission trends, or other measures correlated with treatment admissions. Thus, policy endogeneity results from unobserved time-variant state factors that may be correlated with both parity laws and SA treatment admissions. This is analogous to an omitted variables bias in an intertemporal context. Similar to the approach followed by Gruber and Zinman (2001) and Dave (2008), specifications 3-5 attempt to correct for this endogeneity by controlling for lagged measures potentially driving state parity laws such as lagged SA treatment admissions (Specification 3), lagged state health care spending per capita, Medicaid spending per enrollee, and Medicaid enrollment (Specification 4), and finally, (Specification 5) lagged state suicide mortality (a proxy for mental illness) and lagged state arrests related to drug possession and drug abuse violations (as proxies for state drug policy). Specification 3 further controls for state-specific linear trends, which account for unobserved state-specific factors that vary systematically over time. The estimates are relatively robust and similar to the DDD estimate -- broad parity appears to increase self-referred admissions by 9.6 to 15.9 percent.[23]

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[23] In all models, the effect of limited parity laws is insignificant (not reported in Table 4).

Specification 6 implements an additional check for policy endogeneity with lagged and leading parity legislation, following Model (1993). In such specifications, only the coefficients on the lagged policy measure should be significant. The lead effects should be insignificant with coefficients close to zero. This would then suggest that changes in parity laws are driving changes in treatment admissions. If the leading effects are significant, then this suggests that parity laws are conditionally correlated with past shocks to treatment admissions, which would be an indication of policy endogeneity.[24] The point estimate of the lead broad parity law coefficient is insignificant and relatively small in magnitude, suggesting that current treatment admissions do not seem to be correlated with future parity laws. Furthermore, the lagged effects are slightly larger than the contemporaneous effects estimated in specifications 3-5, suggesting a small lagged response to policy in addition to the contemporaneous effect.

Table 4 Panel B presents models for privately-referred admissions. The extended specifications suggest that broad parity increased such admissions between 8.4 - 16.2 %, enveloping the DDD estimate of 11.4 % (Table 3). Overall, the estimates from Table 4 suggest that the results are robust to unobserved shocks and policy shifts possibly confounding the relationship between parity laws and treatment admissions.

5.3 State Parity Legislation and Insurance Status of Individual Treatment Admissions

The most likely channel through which parity mandates affect treatment is through individual coverage, and to investigate this we next analyze whether the laws affected the observed coverage of treatment admissions. Table 5 presents estimation of equation (2). The first specification indicates that, relative to states that offer weak parity, states which mandate broad parity have a higher probability (by 3.7 percentage points) that the treatment admission is

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[24] Results are robust to alternate lag and lead structures. Results are also similar for models that control for contemporaneous (in lieu of lagged) parity laws in these specifications.

privately insured after enacting the law. There is no commensurate significant impact of limited parity legislation.

While parity legislation is likely to affect employed individuals or their spouses and dependents who have some form of health insurance, public funding is likely to target more vulnerable populations at risk of being on public support. Thus, crowd-out of private for public coverage is not a significant concern. Nevertheless, the possibility remains that states may be relying on parity legislation as a substitute for public funding or public coverage of mental health and SA treatment. Specification 2 suggests that this is not the case; among states which enacted broad parity, public insurance coverage of treatment admissions actually increased. The combined increase in private and public coverage of SA admissions serves to reduce the probability that an admission is uninsured by ten percentage points among states that enact broad parity (specification 3).

That broad mental health parity raises the probability of a publicly-insured admission is suggestive of states increasing funding efforts to treat and prevent SA problems over the sample period. This is supported by our finding that while limited parity has no impact on private insurance, it is associated with a 2.5 percentage points increase in public insurance coverage which is mirrored by a decrease of a similar magnitude in the probability of an uninsured admission. SA funding through block grants was increasing at an average annual rate of about five percent. General expansions in Medicaid eligibility were also under way, reflected in the increase in the prevalence of public insurance among treatment clients (Table 1), and many states started to include drug treatment coverage under welfare reform or mandatory diversion programs. To the extent that these policies also coincided with the enactment of parity legislation, the estimate of the net effect of broad parity on uninsured admissions would be biased upwards (in absolute magnitude). Specifications 4-6 correct for this confounding by

adding in a vector of state funding-related covariates, including the SA treatment block grant and the percent of treatment admissions in the state covered by Medicaid and covered under other government payments. It is reassuring that, in specification 5, broad or limited parity legislation no longer has any effect on the probability that the admission is publicly insured. Parity legislation should most plausibly affect private insurance coverage. Specifications 4 and 6 indeed suggest that broad SA parity raises the probability that an admission is privately insured and lowers the probability that an admission is uninsured by about 3.5 to 3.9 percentage points. There is no effect of limited parity on insurance coverage of treatment admissions. The next two models control for a rich set of client-specific covariates including indicators for employment, marital status, and substances of abuse and also control for lagged measures of drug enforcement and suicide mortality in the state. The magnitude of the effects remains robust.

This decline in the uninsured propensity, however, may not represent a net benefit or financial incentive to the individual if the increase in privately insured admissions (reduction in uninsured) is crowding out no-charge admissions. Parity laws would impart a financial incentive to seek treatment only through significant cost-sharing. However, a significant portion (49 % over the sample period) of admissions which are uninsured is not charged payments or falls under charity care. About 40 percent of the uninsured clients pay fully out-of-pocket. The 3.5 to 3.9 percentage-points reduction in the probability of uninsured is roughly divided 40-60 between a decline in no-charge and a decline in self-pay admission probabilities.[25] That is, while comprehensive insurance mandates appear to reduced uninsured admissions, about 40 % of the reduction would have received charity care through the facilities anyway. The remainder of the reduction in uninsured is matched by a decrease in admissions where the individual was fully responsible for payment (self-pay). Thus, the net effect of broad parity on the probability that a

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[25] Results (not reported in the tables) are based on models for dichotomous indicators showing whether the admission was self-pay and no-charge. Reduced sample sizes for detailed payment sources make these estimates more imprecise (p-values between 0.10 and 0.20).

formerly self-paying admission is now covered by private insurance is about 2.1 to 2.4

percentage points. This is the relevant impact to consider since it represents a pure financial

incentive for individuals to seek treatment who otherwise may find it inaccessible due to out-of-

pocket costs. Evaluated at the sample prevalence of uninsured clients, this translates into an

effect size of about 3 - 4 %. The low magnitudes are consistent with the estimates from the

aggregate models in Table 3.[26]

5.4 Impact of Mandated-if-Offered Parity Legislation

All specifications thus far have indicated nil effects of limited parity legislation. Limited

parity states generally have a hodgepodge of laws with various exceptions and none requires

group plans to provide both mental health and SA treatment benefits at full parity. In order to

investigate whether some of these limited laws may be more effective than others, of the limited

parity states, we separate out those that have enacted "mandated if offered" laws. These states

require that mental health overage be equal to other medical conditions only if the plan offers

mental health coverage.[27] The recently enacted 2008 federal law can be classified as "mandated

if offered" since it mandates parity only if the plans offer mental health coverage; it does not

require plans to provide mental health or SA benefits if they do not already do so. The

remaining limited parity states require employers to offer parity in only one of their health plans

(mandated offering) or mandate minimum mental health coverage that is not required to be equal

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[26] The effects of the other demographic characteristics mimic the general composition of the population that is likely to have private health insurance (relative to public insurance or no insurance) -- white, male, and educated. There is a quadratic effect of age as private insurance propensity decreases up to age 32 and then rises subsequently. All models also include indicators for type of treatment into which the client was admitted. Almost half of all SA treatment admissions occur on an ambulatory non-intensive outpatient basis (reference category). Relative to these admissions, those which involve 24-hour detoxification services in non-hospital settings and those which involve long-term (more than 30 days) non-acute care are more likely to be uninsured. All other service setting types are less likely to be uninsured.

[27] States with mandated-if-offered parity laws, as of 2007, are AZ, FL, IA, KY, LA, and NE. In alternate specifications (results available upon request), we also separate out other forms of limited parity (mandated benefits and mandated offering). We do not find significant effects of these other forms of limited parity, though large standard errors owing to a smaller number of states in disaggregated categories calls for some caution in interpreting the insignificant results.

to other medical conditions (minimum mandated benefit). In specifications 1 and 2, we do not find statistically significant effects of mandated-if-offered laws or other limited parity legislation on self-referred and privately-referred SA treatment admissions, relative to weak parity states. This is not surprising given that the laws also do not appear to have imparted substantial cost-sharing; there is no effect on the coverage of treatment admissions and no significant reduction in the probability that the admission is uninsured (specification 3).

6. CONCLUSIONS

The consensus in the prior literature indicates that substance abuse treatment is both efficacious and cost-effective relative to other drug-control alternatives. Furthermore, the gap between heavy drug use and treatment admissions appears to have widened over the last decade. Thus, from a policy standpoint, it is integral to analyze the economic factors that impact flows into substance abuse treatment.

In addition to supply constraints, a significant portion of substance abusers cite cost and accessibility issues as a primary reason for forgoing treatment. For instance, among privately insured individuals in 2007, treatment services were primarily paid out-of-pocket almost half the time; private insurance was the primary source of payment in only about 33 % of the cases. The importance of cost-sharing is highlighted by the analysis of state insurance parity legislation, the results of which indicate that laws which mandate broad parity for SA and mental health treatment are associated with an increase in the total number of self-referred treatment admissions. Such legislation also raises the probability that the admission is privately insured and conversely, decreases the probability that the admission is uninsured. Though there does not appear to be any crowding-out with respect to public insurance support, this is not the case with regard to charity care and non-payment where some crowd-out does exist. Nevertheless, there is a net two to three percentage point reduction in the probability of uninsured self-payer treatment

admissions. These effects are confined to states which support broad and comprehensive parity while states with limited parity do not display any positive impact on the number of treatment admissions or cost-sharing.

Several underlying factors may be attenuating the effect magnitudes of broad parity. First, parity legislation applies only to health insurance already offered and will most likely affect individuals who have some form of non-public coverage. Data from the NSDUH indicate that about 60 % of the drug- and alcohol-abusing population has private health insurance compared to 71 % of individuals who do not have such disorders. This may limit the scope of effectiveness of parity mandates by relating to substance abusers with access to non-public coverage in the first place. Second, even if broad parity is found to have an effect on treatment admissions, policy endogeneity may imply that the estimated effect is understated if states with low levels of treatment admissions are more likely to adopt stricter parity laws. While the specification checks we implemented suggest that the results are not materially affected when addressing this concern, the possibility is not fully discounted. Third, perhaps more relevant for this analysis, the limited effect sizes may also reflect supply and capacity constraints. Even if parity legislation induces demand for treatment by reducing costs among covered individuals, there may be some offset as the number of facilities have remained relatively constant over the past decade and waiting times have trended upwards. This relatively inelastic supply of treatment, together with the two other factors mentioned, suggest that our estimates of the effects of parity on treatment admissions and coverage incentives may be on the conservative side.

Currently, only 12 states mandate that group insurers provide for mental health and SA treatment benefits, and that they do so on equal terms with other benefits, with minimal exceptions. These states' existing laws are, in fact, more protective than the Mental Health Parity and Addiction Equity Act of 2008, leaving significant potential to reduce chronic
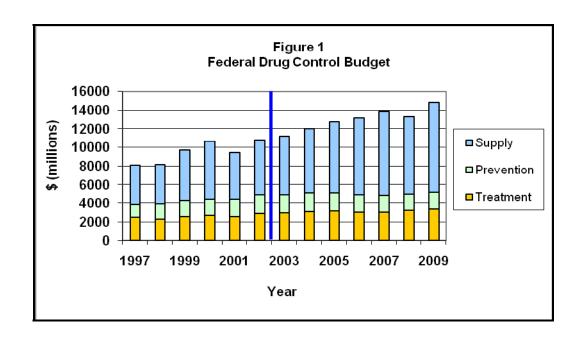
substance abuse through more states adopting stronger parity laws. Though the 2008 Act does require mental health and SA parity with respect to financial requirements and treatment benefits, this applies only to plans that already include mental health coverage in their benefits package. Similar to the 1996 Mental Health Parity Act, the 2008 law not only does not require group plans to include mental health or SA coverage in their benefits, it also allows for cost exemptions. Six states have already enacted "mandated if offered" laws similar to the 2008 Federal law and an additional 15 states require plans to offer minimum mental health coverage (though not necessarily on equal terms as other conditions). Thus, with two-thirds of the nation already mandating parity at a level that is at least as protective as the 2008 federal law, there is perhaps little room for a strong aggregate effect. Furthermore, extrapolating from the estimated effects of limited mental health parity legislation and specifically, from the insignificant effects of the state mandated-if-offered laws, it is unlikely that for the remaining states for whom the 2008 law will be more protective, the federal law will have a significant impact on either cost-sharing of SA treatment admissions, or reduction of out-of-pocket payments for individuals needing treatment, or increase in treatment admission flows.

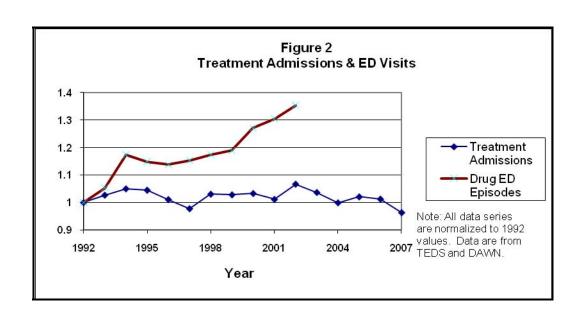Since parity legislation may not help to defray costs for all, policy interventions which subsidize treatment among uninsured users also has the potential to significantly provide treatment to those who need it but cite cost constraints as an impediment. Such demand-focused interventions by themselves, however, are likely to have muted effects unless paired with policies which improve treatment supply and ease capacity constraints.
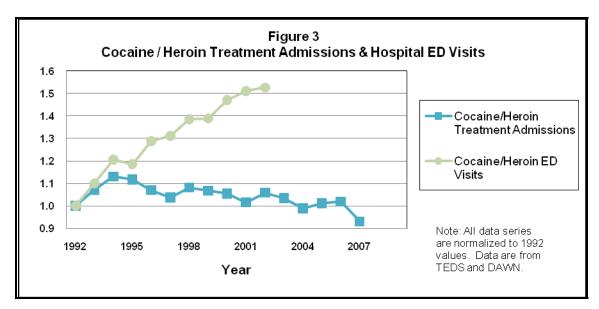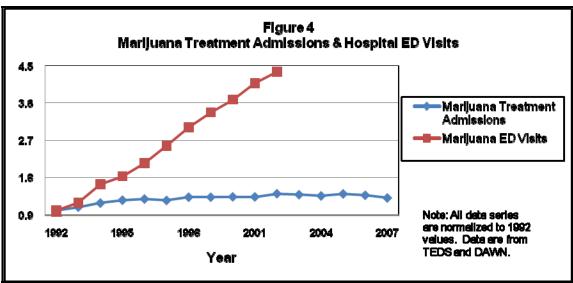
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Figure 1
Federal Drug Control Budget

Figure 2
Treatment Admissions & ED Visits

Note: All data series are normalized to 1992 values. Data are from TEDS and DAWN.

Figure 3
Cocaine / Heroin Treatment Admissions & Hospital ED Visits

Note: All data series are normalized to 1992 values. Data are from TEDS and DAWN.

Figure 4
Marijuana Treatment Admissions & Hospital ED Visits

Note: All data series are normalized to 1992 values. Data are from TEDS and DAWN.

Figure 5
Number of States Legislating Mental Health Parity Laws

Table 1
Demographic Composition [1]

Data Source	TEDS		NHSDA		
Sample	SA Treatment Admissions		Past Year Illicit Drug Use		Past Year Drug or Alcohol Abuse or Dependence
Year	1992	2007	1992	2001	2001
Male	72.6	67.5	59.2	57.3	67.6
White	61.8	65.3	79.1	75.7	74.1
Black	27.2	21.4	11.8	10.6	10.0
Ages 18-24 (TEDS) / 18-25 (NHSDA)	16.7	19.7	36.2	40.0	37.1
Ages 25-34 / 26-34	42.5	27.5	34.2	22.3	21.0
Ages 35-44 / 35-49	28.0	28.0	24.8	30.3	30.5
Ages 45-54 / 50 - 64	9.0	19.7	3.4	6.5	8.1
Employed Full-Time	27.9	22.4	56.0	60.8	61.6
Employed Part-Time	6.8	7.6	13.5	17.0	15.4
Unemployed	29.3	35.0	14.3	5.6	5.6
High School and above	62.8	67.7	79.5	81.4	81.2
Self Referral	36.6	33.9	-	-	-
Criminal Justice Referral	33.0	36.5	-	-	-
Health Care / Employer Referral	9.3	7.4	-	-	-
Private Health Insurance	15.8	11.7	63.5	65.6	67.7
Public Health Insurance	19.2	26.8	13.9	12.5	12.0
Uninsured	65.0	61.5	22.6	21.9	20.3
Payment Source - Private Insurance	9.5	5.3	-	-	-
Payment Source - Public Insurance	12.0	12.8	-	-	-
Payment Source - Self	37.9	21.2	-	-	-
Payment Source - No Charge	16.3	12.4	-	-	-
No Prior Treatment Admissions	44.4	41.7	-	-	-
Days waiting to enter treatment [2]	5.5	6.9	-	-	-
Observations / Prevalence	1,453,260	1,663,097	11.0	11.6	7.2

[1] Data are from the Treatment Episode Dataset and the National Household Survey of Drug Abuse. Cells represent percent of treatment admissions or drug users in each category, except where noted. Observations represent maximum sample size; for some variables, the sample size is less due to missing information.

[2] Mean number of days between initial request for service and actual admission or provision of clinical service.

Table 2
Sample Means
Treatment Episode Data Set (TEDS) & Merged Variables [1]
1992 - 2007

Variable	Definition	Mean (Std. Deviation)
Mental Health Parity - Broad	State provides equal coverage for a broad range of mental health conditions, including substance abuse disorders, with little or no exceptions, and which applies to group health insurance plans	0.1027 (0.3036)
Mental Health Parity - Limited	State has limited mental health insurance parity laws, which for instance limit equal coverage to a specific set of mental health conditions, requires equal coverage only if the plan offers mental health coverage, requires only one plan to offer an option of equal coverage, or mandates minimum but not equal mental health coverage	0.7033 (0.4568)
Mental Health Parity - Weak	State has no laws relating to mental health insurance parity or state has weak laws with various exceptions such as excluding substance abuse disorders and applicable to only state employees	0.1940 (0.3954)
Mental Health Parity - Mandated if Offered	State Requires that mental health overage be equal to other medical conditions if the plan already offers mental health coverage	0.1166 (0.3211)
Age	Age of admission	35.0416 (9.7129)
Male	Client is male	0.6992 (0.4586)
White	Client is White	0.6183 (0.4858)
Black	Client is Black	0.2544 (0.4355)
Other Race	Client is of a race other than White or Black	0.1273 (0.3333)
Hispanic	Client is Hispanic	0.1270 (0.3330)
High School	Client is a high school graduate	0.6493 (0.4772)
College	Client is a college graduate	0.0461 (0.2096)
Private Insurance	Client has private health insurance	0.1247 (0.3304)
Public Insurance	Client has public health insurance, including Medicaid or Medicare	0.2262 (0.4184)
Uninsured	Client is uninsured	0.6491 (0.4773)
Payment Source - Private Insurance	Treatment is covered under private insurance	0.0738 (0.2614)
Payment Source - Public Insurance	Treatment is covered under public insurance	0.1372 (0.3441)
Payment Source - No Insurance	Treatment is not covered under any insurance	0.7890 (0.4080)
Payment Source - Self-Pay	Primary source of payment for the treatment admission is self-pay	0.2949 (0.4560)
Payment Source - Other	Treatment service is provided at no-charge or covered through other government payments	0.4941 (0.5000)
Referral Source - Self	Client was referred to substance abuse treatment through self, family or friend	0.3607 (0.4802)
Referral Source - Private	Client was referred to substance abuse treatment through self, family,	0.3390

	friend, health care provider, or employer	(0.4734)
Referral Source - Criminal Justice	Client was referred to substance abuse treatment through any police official, judge, prosecutor, probation officer, or other person affiliated with a Federal, State, or county judicial system	0.4456 (0.4970)
State Treatment Admissions	Total annual substance-abuse treatment admissions in state	93291.41 (90814.77)
State Population	State population, in millions Source: U.S. Census Bureau	11.71 (9.45)
State Unemployment	State unemployment rate, in percentage points Source: U.S. Bureau of Labor Statistics	5.35 (1.37)
State Personal Income	State personal income per capita, in thousands Source: U.S. Bureau of Labor Statistics	30.16 (6.99)
State SA Block Grant	State substance abuse prevention and treatment block grant, in millions of dollars. Source: National Conference of State Legislatures	64.09 (61.25)
AFDC Waiver	Indicator for whether state has enacted major waivers to its Aid to Families with Dependent Children program prior to TANF implementation Source: USDHHS, 1999; CEA 1997	0.0913 (0.2734)
TANF	Indicator for whether state has enacted Temporary Aid for Needy Families Source: USDHHS, 1999; CEA 1997	0.6920 (0.4527)
Welfare Caseload	Number of welfare recipients in state, in thousands Source: Administration for Children and Families, USDHHS	419.07 (556.45)
State Health Expenditures	State per capita total health care expenditures, in dollars Source: Centers for Medicare and Medicaid Services	4018.48 (964.86)
State Medicaid Expenditures	State Medicaid expenditures per enrollee, in dollars Source: Centers for Medicare and Medicaid Services	5862.37 (2403.13)
State Medicaid Enrollment	State Medicaid enrollment, in thousands Source: Centers for Medicare and Medicaid Services	1661.42 (1750.69)
State Suicide Mortality	Total deaths in state from suicide Source: Web-based Injury Statistics Query and Reporting System, Centers for Disease Control and Prevention	1136.18 (908.61)
State Drug Abuse Arrests	Total arrests in state related to any drug abuse violation, in thousands Source: Uniform Crime Reports, FBI	75.04 (82.35)
State Drug Possession Arrests	Total arrests in state related to drug possession or use, in thousands Source: Uniform Crime Reports, FBI	56.78 (67.59)
Service Setting - Detox. 24-hr. Hospital Inpatient	24-hour acute care services in a hospital setting for detoxification of persons with severe medical complications associated with withdrawal	0.0537 (0.2254)
Service Setting - Detox. 24-hr. Non-Hospital	24-hour services in a non-hospital setting for safe withdrawal and transition to ongoing treatment	0.1782 (0.3827)
Service Setting - Rehab. Hospital Non-Detox.	24-hour per day medical care in hospital facility in conjunction with treatment services for substance abuse and dependency	0.0097 (0.0981)
Service Setting - Rehab. Short-Term	Typically 30 days or less of non-acute care in a setting with treatment services for substance abuse and dependency	0.0840 (0.2774)
Service Setting - Rehab. Long-Term	Typically more than 30 days of non-acute care in a setting with treatment services for substance abuse and dependency	0.0764 (0.2657)
Service Setting - Ambulatory Intensive Outpatient	At minimum, the client must receive treatment lasting two or more hours per day for three or more days per week	0.0878 (0.2830)
Service Setting - Ambulatory Non-Intensive Outpatient	Ambulatory treatment services including individual, family, and/or group services and/or pharmacological therapies	0.4791 (0.4996)
Service Setting - Ambulatory Detox.	Outpatient treatment services providing for safe withdrawal in an ambulatory setting	0.0310 (0.1734)
Alcohol	Alcohol is cited as the primary, secondary, or tertiary substance of abuse	0.6862 (0.4640)
Cocaine	Cocaine is cited as the primary, secondary, or tertiary substance of abuse	0.3471 (0.4761)
Heroin	Heroin is cited as the primary, secondary, or tertiary substance of abuse	0.1811 (0.3851)
Marijuana	Marijuana is cited as the primary, secondary, or tertiary substance of abuse	0.3039

		(0.4599)
Number of Substances	Total number of substances cited	1.7226
		(0.8139)

[1] There were a total of 25,742,103 substance-abuse treatment admissions in TEDS between 1992 and 2007. Sample size listed is the maximum number of observations. For some variables (mostly, insurance and payment source), sample sizes are smaller due to missing records. Data for state health and Medicaid expenditures/enrollment span 1992-2004.

Table 3
State Health Insurance Parity and Aggregate SA Treatment Admissions [1]
Poisson Regression Models

Dependent Variable	SA Treatment Admissions Total	SA Treatment Admissions Self-Referred	SA Treatment Admissions Privately-Referred	SA Treatment Admissions Criminal Justice-Referred
Model	1	2	3	4
Mental Health Parity - Broad	0.1278** (0.0512)	0.2314*** (0.0478) DDD=0.1382** [0.0692]	0.2066*** (0.0487) DDD=0.1134* [0.0675]	0.0931 (0.0587)
Mental Health Parity - Limited	0.0473* (0.0277)	0.0020 (0.0309) DDD = -0.0125 [0.0522]	-0.0162 (0.0283) DDD = -0.0306 [0.0490]	0.0145 (0.0396)
Age	-0.0778 (0.2753)	1.0008** (0.3919)	0.8173** (0.3528)	3.6379*** (0.5957)
Age-squared	0.0019 (0.0038)	-0.0129** (0.0056)	-0.0105** (0.0050)	-0.0548*** (0.0086)
Male	0.2870 (0.4886)	-2.7177*** (0.3828)	-2.7246*** (0.4004)	3.1953*** (0.7750)
Black	0.8618** (0.3868)	0.9702** (0.3856)	0.6742* (0.3458)	0.7257* (0.4065)
Other Race	-0.2776 (0.2173)	-1.0809*** (0.2616)	-1.1632*** (0.2237)	0.0891 (0.3140)
Hispanic	0.2497 (0.1922)	-0.0403 (0.2066)	-0.0791 (0.1912)	0.0053 (0.2363)
High School	0.7197** (0.3671)	1.9576*** (0.3846)	1.8574*** (0.3536)	-1.4325*** (0.4252)
College	1.2810** (0.5892)	0.4076 (0.3736)	0.4568 (0.3617)	-0.7130 (0.5244)
Log State Population	-0.3023 (0.3030)	-0.9023*** (0.2858)	-0.4142 (0.2626)	0.3394 (0.3210)
State Indicators	Yes	Yes	Yes	Yes
Year Indicators	Yes	Yes	Yes	Yes
Pseudo R-squared	0.970	0.976	0.977	0.951
Observations	752	745	745	745

[1] Dependent variable represents a count of the number of SA treatment admissions, aggregated for each state and year. Coefficient estimates from fixed effects Poisson regression models are presented. Standard errors are adjusted for over-dispersion and reported in parentheses. DDD estimate is obtained by subtracting the coefficient estimate on Criminal Justice Referrals reported in model 4, and standard errors for the differenced estimates are presented in brackets. Models for self-referred, privately-referred, and criminal-justice referred admissions also control for total SA treatment admissions. Statistical significance is denoted as follows: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.10$. Pseudo R-squared represents one minus the ratio of the log-likelihoods for the full model versus the intercept-only model.

Table 4
State Health Insurance Parity and Aggregate SA Treatment Admissions [1]
Poisson Regression Models
Specification Checks

Model	1	2	3	4	5	6
Panel A - Dependent Variable: SA Treatment Admissions Self-Referred						
Mental Health Parity - Broad (Contemporaneous)	0.1539*** (0.0447)	0.1587*** (0.0426)	0.0960** (0.0409)	0.1444*** (0.0506)	0.1266*** (0.0412)	–
Mental Health Parity - Broad (Lag)	–	–	–	–	–	0.1650*** (0.0405)
Mental Health Parity - Broad (Lead)	–	–	–	–	–	-0.0046 (0.0585)
Pseudo R-squared [2]	0.978	0.978	0.989	0.981	0.980	0.982
Observations	745	745	692	557	745	638
Panel B - Dependent Variable: SA Treatment Admissions Privately-Referred						
Mental Health Parity - Broad (Contemporaneous)	0.1583*** (0.0469)	0.1621*** (0.0452)	0.0838** (0.0418)	0.1495*** (0.0524)	0.1310*** (0.0435)	–
Mental Health Parity - Broad (Lag)	–	–	–	–	–	0.1385*** (0.0433)
Mental Health Parity - Broad (Lead)	–	–	–	–	–	0.0258 (0.0613)
Pseudo R-squared	0.978	0.979	0.989	0.982	0.980	0.983
Observations	745	745	692	557	745	638
State Covariates [2]	Yes	Yes	Yes	Yes	Yes	Yes
Criminal Justice-Referred SA Treatment Admissions	No	Yes	Yes	Yes	Yes	Yes
Lagged State SA Treatment Admissions	No	No	Yes	No	No	Yes
Lagged State Health & Medicaid Spending [3]	No	No	No	Yes	No	No
Lagged State Suicide Mortality [4]	No	No	No	No	Yes	Yes
Lagged State Drug Abuse Arrests [4]	No	No	No	No	Yes	Yes
Lagged State Drug Possession Arrests [4]	No	No	No	No	Yes	Yes
State-Specific Trends	No	No	Yes	No	No	No
State Indicators	Yes	Yes	Yes	Yes	Yes	Yes
Year Indicators	Yes	Yes	Yes	Yes	Yes	Yes

[1] See notes to Table 1.

[2] Vector includes contemporaneous and one-year lag of state personal income per capita and state unemployment rate, state substance abuse prevention and treatment block grant, and indicators of welfare reform (AFDC Waiver, TANF, and log welfare caseloads).

[3] Vector includes one and two-year lags of total health care spending per capita in state, state Medicaid spending per enrollee, and state Medicaid enrollment.

[4] Vector includes one and two-year lags of state suicide deaths, state-level arrests from any drug abuse violation, and state-level arrests for illicit drug possession.

Table 5
State Health Insurance Parity and Insurance Status of Treatment Admissions [1]
Probit Regression Models

Model	1	2	3	4	5	6	7	8
Dependent Variable	Admission Privately Insured	Admission Publicly Insured	Admission Uninsured	Admission Privately Insured	Admission Publicly Insured	Admission Uninsured	Admission Privately Insured	Admission Uninsured
Mental Health Parity - Broad	0.0369*** (0.0126)	0.0665*** (0.0185)	-0.0998*** (0.0245)	0.0352*** (0.0121)	-0.0018 (0.0067)	-0.0390*** (0.0138)	0.0346*** (0.0115)	-0.0390*** (0.0137)
Mental Health Parity - Limited	0.0026 (0.0029)	0.0248*** (0.0058)	-0.0263*** (0.0081)	0.0043 (0.0030)	-0.0007 (0.0030)	-0.0008 (0.0061)	0.0047 (0.0028)	-0.0016 (0.0061)
Age	-0.0027*** (0.0002)	0.0002 (0.0003)	0.0040*** (0.0004)	-0.0026*** (0.0002)	0.0002 (0.0003)	0.0040*** (0.0004)	-0.0024*** (0.0002)	0.0037*** (0.0004)
Age-squared	0.00004*** (0.0000)	0.00002*** (0.0000)	-0.0001*** (0.0000)	0.00004*** (0.0000)	0.00002*** (0.0000)	-0.0001*** (0.0000)	0.00004*** (0.0000)	-0.0001*** (0.0000)
Male	0.0094*** (0.0011)	-0.1185*** (0.0030)	0.1232*** (0.0027)	0.0093*** (0.0011)	-0.1189*** (0.0029)	0.1236*** (0.0027)	0.0077*** (0.0011)	0.1215*** (0.0027)
Black	-0.0271*** (0.0012)	0.0483*** (0.0032)	-0.0132*** (0.0036)	-0.0270*** (0.0012)	0.0469*** (0.0030)	-0.0121*** (0.0034)	-0.0226*** (0.0011)	-0.0164*** (0.0030)
Other Race	-0.0060*** (0.0014)	0.0019 (0.0022)	0.0116*** (0.0034)	-0.0061*** (0.0014)	0.0008 (0.0022)	0.0124*** (0.0033)	-0.0064*** (0.0013)	0.0123*** (0.0033)
Hispanic	-0.0147*** (0.0014)	0.0082*** (0.0016)	0.0187*** (0.0026)	-0.0147*** (0.0014)	0.0088*** (0.0016)	0.0185*** (0.0026)	-0.0119*** (0.0013)	0.0162*** (0.0025)
High School	0.0234*** (0.0007)	-0.0408*** (0.0012)	0.0141*** (0.0018)	0.0233*** (0.0007)	-0.0405*** (0.0011)	0.0137*** (0.0017)	0.0223*** (0.0007)	0.0139*** (0.0017)
College	0.0402*** (0.0015)	-0.0346*** (0.0012)	-0.0340*** (0.0035)	0.0400*** (0.0015)	-0.0343*** (0.0011)	-0.0348*** (0.0035)	0.0356*** (0.0014)	-0.0332*** (0.0034)
Treatment Service Setting Indicators [2]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Covariates [3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Funding Covariates [4]	No	No	No	Yes	Yes	Yes	Yes	Yes
Admission Characteristics [5]	No	No	No	No	No	No	Yes	Yes
Lagged State Suicide / Drug Arrest Measures [6]	No	No	No	No	No	No	Yes	Yes
Year Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Pseudo R-squared	0.159	0.252	0.254	0.160	0.261	0.248	0.170	0.249
Percent Correctly Predicted	67.5	87.3	82.3	67.6	87.9	82.1	69.3	82.1
Observations	7,172,094	7,172,094	7,172,094	7,172,094	7,172,094	7,172,094	7,172,094	7,172,094

[1] Dependent variable represents a dichotomous indicator of whether a substance abuse treatment admission is privately insured, publicly insured, or uninsured. Marginal effects from probit models are presented. Standard errors are adjusted for arbitrary correlation within state-year cells and reported in parentheses. Significance is denoted as follows: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.10$. Pseudo R-squared (representing one minus the ratio of the log-likelihoods for the full model versus the intercept-only model) and Percent Correctly Predicted (based on the predicted probability relative to a cutoff of the sample mean) are presented as goodness-of-fit measures.

[2] Vector includes seven indicators for service provider type: 24 hour detox services in hospital and non-hospital settings, 24 hour non-detox medical care in hospital setting, short-term (30 days or less) non-acute care, long-term (more than 30 days) non-acute care, ambulatory intensive outpatient, and ambulatory detoxification). Reference group is ambulatory non-intensive outpatient.

[3] Vector includes total number of substance abuse treatment admissions in the state, state-level personal income per capita, state unemployment rate, and log state population.

[4] Vector includes state substance abuse treatment block grant, percent of treatment admissions in state covered by Medicaid, and percent of treatment admissions in state covered by state funds including public insurance and other state payments to SA facilities.

[5] Vector includes indicators for number of substances of abuse, and indicators for whether alcohol, cocaine, heroin, and marijuana were cited as the primary, secondary, or tertiary substances of abuse.

[6] Vector includes one and two-year lags of state suicide deaths, state-level arrests from any drug abuse violation, and state-level arrests for illicit drug possession.

Table 6
Effect of Mandated Offering Legislation [1]

Estimation	Poisson		Probit
Dependent Variable	SA Treatment Admissions Self-Referred	SA Treatment Admissions Privately-Referred	Admission Uninsured
Model	1	2	4
Mental Health Parity - Mandated if Offered	0.0544 (0.0574)	0.0579 (0.0490)	0.0044 (0.0077)
Mental Health Parity - Other Limited	0.0095 (0.0314)	0.0222 (0.0307)	-0.0008 (0.0066)
State Indicators	Yes	Yes	Yes
Year Indicators	Yes	Yes	Yes
Pseudo R-squared	0.981	0.982	
Observations	644	644	6,913,414

[1] Sample is limited to states and years which have not enacted broad mental health parity legislation. Reference category is weak parity. For Poisson models, dependent variable represents a count of the number of SA treatment admissions, aggregated for each state and year. Models control for basic covariates listed in Table 2, state covariates, and vector of lagged suicide mortality and drug arrests. For probit models, dependent variable represents a dichotomous indicator of whether a substance abuse treatment admission is privately insured or uninsured. Marginal effects are presented. See notes to Table 5. Model controls for basic covariates listed in Table 5, state covariates, service setting, admission characteristics, and vector of lagged suicide mortality and drug arrests.