

Medicaid Prior Authorization Policies and Imprisonment Among Patients With Schizophrenia

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Increasingly, public and private healthcare plans are imposing prior authorization requirements to manage drug spending. Prior authorization plans establish a preferred drugs list (PDL) and require authorization before covering drugs not on the PDL. Such programs are designed to reduce costs by steering utilization toward lower-cost medications, but these policies may also lead to poorer drug adherence.¹ Poor adherence to or discontinuation of antipsychotic drugs among patients with schizophrenia is likely to cause acute psychotic episodes²⁻⁴ and often results in contact with law enforcement officers due to threatening behaviors brought on by active symptoms, leading to arrest and incarceration.⁵

While schizophrenia affects only about 1% of the US population,⁶ it is difficult and expensive to treat and can have a devastating impact if not well controlled.⁷ The effects of losing continuous effective exposure to medication due to nonadherence are immediate and evident. A study on the temporal relationship between medication nonadherence and hospitalization risk for individuals with schizophrenia found that individuals in the first 10 days following a missed prescription refill had a greater than 50% increase in the risk of mental health hospitalization and a 77% increase in the risk of schizophrenia-specific hospitalization.⁸

As a result of their behavior, mentally ill people are more likely to be arrested than other people who are stopped by police, and more likely to be subsequently convicted and incarcerated.⁹ Enforcement officials may not be sufficiently trained to recognize mentally ill patients, or they may feel obliged to bring the schizophrenic offender to the criminal justice system when the healthcare system is unwilling or unable to accept a violent patient. Prison systems are often poorly equipped to treat the mentally ill, and, when released these prisoners are more likely to recidivate,¹⁰ which promotes the vicious cycle of mentally ill criminals entering the criminal justice system, suffering further mental health deterioration in prison, and upon release ending up with a significant likelihood of re-arrest due to poorly controlled mental illness.

ABSTRACT

Objective

To examine the impact of Medicaid prior authorization for atypical antipsychotics on the prevalence of schizophrenia among the prison population.

Study Design

We collected drug-level information on prior authorization restrictions from Medicaid programs in 30 states to determine which states had prior authorization requirements before 2004. We linked the regulatory data to a survey of prison inmates conducted in 2004.

Methods

We used a sample of 16,844 inmates from a nationally representative survey and analyzed the data using cross-sectional regression. To capture the impact of prior authorization, we estimated 2 models: the first included an indicator variable for states requiring prior authorization, and a second model used per capita atypical usage.

Results

Evidence indicated that prior authorization restrictions on atypical antipsychotics are associated with an increase in the odds of a schizophrenic resident being imprisoned in a state. State-level prior authorization requirements for atypical antipsychotics are associated with a 2.7% increase in the likelihood that an imprisoned inmate displays psychotic symptoms, and a 1.25 increase in the likelihood that an inmate was previously diagnosed with schizophrenia by a physician. Higher state-level atypical prescriptions per capita are also associated with lower likelihood of psychotic symptoms and of prior schizophrenia diagnosis among prisoners.

Conclusions

Prior authorization requirements for atypical antipsychotics, which are designed to reduce healthcare costs, are associated with greater prevalence of mental illness within the criminal justice system. This association raises important questions about whether increased costs to the criminal justice system might mitigate or offset prescription drug savings created by prior authorization requirements.

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Take-Away Points

We examined the impact of prior authorization formularies on the likelihood that patients with schizophrenia will be arrested and incarcerated.

These findings suggest that prior authorization requirements for atypical antipsychotics, which are designed to reduce healthcare costs, can result in increased expenditures for the criminal justice system. Given the high cost of incarceration, these increased costs to the criminal justice system could easily offset any savings created by prior authorization requirements.

- Prior authorization requirements for atypical antipsychotics are associated with a 22% increase in the likelihood of imprisonment compared with the likelihood in a state without such a requirement.
- Prior authorization requirements were found to be associated with an increased likelihood that individuals with schizophrenia will be incarcerated for nonviolent drug offenses.
- As the total costs in the United States that are associated with severe psychiatric disorders in jails are very high, new policies on how to treat incarcerated individuals with schizophrenia, particularly nonviolent offenders, are warranted.

Evidence also shows that the mentally ill are more costly to incarcerate than those without mental illness and that other types of rehabilitation for the mentally ill may reduce crime at costs lower than those associated with incarceration.¹¹ Over the past several decades, pharmaceutical advancements in the treatment of schizophrenia have been shown to reduce the likelihood of episodes that start the sequence of events leading to incarceration of patients. The second-generation antipsychotics known as *atypicals* were introduced in the 1990s. These have largely replaced older antipsychotics, because they are associated with lower rates of relapse. About 30% to 40% of patients relapsed with first-generation drugs (relative to 80% without treatment); for second-generation drugs, relapse rates fell to about 25% to 29%.¹²⁻¹⁴ Furthermore, many patients respond to only 1 drug, so that increased treatment options increase the likelihood of successful treatment.¹⁵ The lower rates of relapse seen with atypicals may lead to fewer incidents with law enforcement and reduced incarceration of schizophrenia patients.

The evidence suggests that atypicals improve outcomes for certain patients with schizophrenia. The Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) study found that perphenazine (Trilafon), an older typical, worked about as well as several newer atypicals for the average patient in the trial.^{16,17} Subsequent research on the CATIE data clarified that a subset of patients in CATIE strictly benefited from atypical usage, and that providing typicals to all patients would have reduced overall health.¹⁸ Taken together, this literature suggests that atypicals represent a valuable treatment option for some patients with schizophrenia.

CONCEPTUAL FRAMEWORK

In this study, we examine the association between Medicaid policy and 2 key outcomes—namely, utilization

of antipsychotics and imprisonment of patients with schizophrenia. We compared the prevalence of patients in prison among states that did or did not institute prior authorization programs for atypical antipsychotics. We also compared prevalence across states that have different levels of atypical antipsychotic utilization. Because of the association between prior authorization regulations and increased risk of discontinuing atypical treatment, and because of the potential link between untreated schizophrenia and incarceration, we hypothesized that

prior authorization rules will increase the likelihood that a schizophrenia patient is incarcerated.

Ideally, we would like to have measured the percentage of each state's population with schizophrenia that is incarcerated, and then examined how this percentage is associated with state prior authorization policy. In practice, we were able to obtain only the percentage of the incarcerated population who were diagnosed as having schizophrenia in each state. If it is assumed that Medicaid pharmacy regulations have no impact on the overall prevalence of schizophrenia in a state, and that they have negligible impact on the rate at which nonschizophrenics are imprisoned, then the impact of pharmacy regulations on the prevalence of schizophrenia in prisons will be comparable with the impact of these regulations on the rate of imprisonment of patients with schizophrenia.

A simplified summary of the underlying process illustrates how restrictive pharmacy policies in Medicaid might lead to a higher prevalence of schizophrenia in prison:

- Stage 1: A large majority of patients with schizophrenia are covered by Medicaid.
- Stage 2: The state's restrictive prior authorization policy leads to discontinued, reduced, or inappropriate medication.
- Stage 3: Suboptimal medication leads to uncontrolled symptoms.
- Stage 4: Active symptoms or deteriorated economic conditions that result from uncontrolled symptoms lead to encounters with law enforcement and arrest.
- Stage 5: Repeated or serious arrests lead to imprisonment.

Our hypothesis is that Medicaid prior authorization regulations limit access to atypicals, and that this increa-

■ **Table 1.** Comparison of Symptom-Based Versus Diagnosis-Based Screening

	Any Symptoms of Psychosis? (symptom-based screen)			
	No	Yes	Missing	Total
Diagnosed with schizophrenia? (diagnosis-based screen)				
No	13,672	2087	1315	17,074
Yes	0	728	47	775
Missing	0	25	311	336
Total	13,672	2840	1673	18,185

ses the likelihood that a patient will progress down the list from stage 2 to stage 5.

DATA

Prison Data

Our analysis made use of the 2004 Survey of Inmates in State Correctional Facilities (SISCF) and the 2004 Survey of Inmates in Federal Correctional Facilities (SIFCF) conducted for the Bureau of Justice Statistics by the Bureau of the Census; these surveys have been used in previous research.¹⁹ They provide nationally representative data on inmates held in state and federal prisons obtained through personal interviews of more than 18,000 inmates in about 300 prisons. These data contain individual-level information on inmates' mental health conditions and various personal characteristics. A benefit of the SISCF data is that they also contain state indicators, which allow us to match the data to our original survey of antipsychotic coverage.

Regulation Data

Using a mailed survey that was conducted in 2009, we collected information from 30 state Medicaid programs on their utilization review policies for atypical antipsychotics over the period 1999 to 2008.²⁰ This survey asked whether prior authorization policies applied to a list of drugs identified by US brand name. To supplement the survey information, we examined Medicaid pharmacy program websites for relevant documents and contacted Medicaid program personnel. This allowed us to identify the 4 states (AK, CA, MA, and NY) that had prior authorization for all atypicals before 2003, along with 24 states that we can determine had no prior authorization before the 2004 SISCF survey. For the remaining states, we are unable to determine the prior authorization policy in 2003, because information on the timing of prior authorization implementation is unclear or unavailable from the mailed survey or websites. (See [Appendix A](#) for a list of states by policy status.)

Utilization Data

State-level utilization data were obtained from the State Drug Utilization Data Files available from CMS. These data, which include the number of prescriptions filled for each drug by each state Medicaid program by calendar quarter, were obtained for 2003 atypical antipsychotics. State-level Medicaid enrollments as of June of each year were obtained from the Kaiser Family Foundation's State Health Facts database.

Prevalence in the General Population

We used prevalence of serious psychological distress (SPD) estimated from the 2003-2004 National Surveys on Drug Use and Health, produced by the Substance Abuse and Mental Health Services Administration (SAMHSA), as a proxy for the prevalence of schizophrenia in the general population. Serious psychological distress was measured using the K6 screening instrument for nonspecific psychological distress. In 2003-2004, SPD was noted in about 10% of the population 18 years or older. If we can assume that the percentage of schizophrenia in SPD does not vary by status of prior authorization or level of atypical utilization, then such an approximation does not affect interpretation of our results.

Measurement

We estimated the probability that an inmate is screened as positive for psychotic symptoms, and whether an inmate reports a prior schizophrenia diagnosis, using a linear probability model. In addition to an indicator variable that equals 1 if the state in which the inmate is incarcerated has a prior authorization rule for atypical antipsychotics, we included the prevalence of schizophrenia in the general population in the state and several individual inmate characteristics found in [Table 1](#).

As documented in [Table 1](#), the probability that a prisoner was previously diagnosed with schizophrenia is relatively low, and this suggests the linear probability modeling approach. Logistic regression is known to per-

form poorly in binary dependent variable models where positive outcomes are statistically rare; in contrast, linear probability model performance is invariant to the mean of the dependent variable.²¹ In any event, however, the association between prior authorization (or atypical usage) and the prevalence of mental illness within prisons is robust and statistically significant across linear probability, logistic regression, and probit models. Therefore, our results are not primarily dependent on functional form. All our modeling results are presented for the logistic regression model in eAppendix Tables 1 and 2. The results are qualitatively similar.

Outcome Variable

The outcome variable is an indicator of whether an inmate has screened positive for psychotic symptoms. We utilize 2 questions from the survey. In the first, the survey asked inmates whether during the past year they had seen or heard things that other people said were not there, felt that other people were able to read or control their mind, or felt that someone other than the corrections staff had been spying on or plotting against the inmate. Inmates who answered yes to any of these questions were screened as positive for psychotic symptoms in our analysis. This question measures the presence of psychotic symptoms. Note that it is broader than schizophrenia. Our second measure focuses on a much narrower definition, based on a question that asks the inmate if they have ever been diagnosed by a healthcare provider with schizophrenia or a psychotic disorder. This definition will undercount those inmates who are unwilling or unable to identify themselves as schizophrenic but has the advantage of not resulting from self-diagnosis. As shown in Table 1, 2840 inmates screened positive using the more inclusive definition while 775 reported a prior diagnosis. Significantly, all those with a prior diagnosis also tested positive for the presence of psychotic symptoms.

Explanatory Variables

Two alternative measures of an inmate's access to atypicals were used. The first is whether the state's Medicaid program has a prior approval requirement in its formulary, and the second is the Medicaid utilization level of atypical antipsychotics in an inmate's resident state. Because acute symptoms of schizophrenia can occur after only a few days of missing medication, the lapse between regulation and the effects on imprisonment of schizophrenia patients is likely to be relatively short.

The analysis also included a group of control variables that are commonly suspected to contribute to the onset

of schizophrenia: age, gender, race, whether born in the United States, whether completed high school, whether lived with parents when growing up, whether sexually abused as a child, whether caretaker had substance abuse problems, and whether physically abused before admission to prison.

Definition of Subsamples

Along with the full sample of inmates, results were estimated separately on the basis of the type of crime for which the inmate had been convicted. These conviction subgroups include those convicted of 1) violent, 2) drug-related, or 3) nonviolent and nondrug offenses. Note that an inmate convicted of both violent crimes and drug crimes was placed in the violent crime group. Some inmates were excluded from subpopulation analysis because available information regarding their offenses was insufficient.

RESULTS

Characteristics of Inmates in States With and Without Prior Authorization

Table 2 tabulates characteristics of prison inmates in states with and without prior authorization policy for atypicals, as well as state-level characteristics. All statistics were weighted by the inmate population.

A total of 16,844 surveyed inmates from 48 states were included in either regulation analysis or utilization analysis, representing 1,254,589 inmates nationally. Of the surveyed inmates, 3205 came from 4 states (AK, CA, MA, and NY) that instituted prior authorization for atypicals in 2003; 10,375 came from 24 states that had no prior authorization for atypicals in 2003; and the remaining 3264 came from states for which regulation information was unknown.

About a quarter of the inmates resided in states that instituted prior authorization for atypicals in 2003. In these states, the prevalence of serious mental illness in the general population is lower (10.9% vs 11.7%) but the percentage of inmates who screened positive for psychotic symptoms in prison is slightly higher (17.8% vs 17.0% when screened by psychotic symptoms and 5.05% vs 4.35% when screened by prior schizophrenia diagnosis). Per capita Medicaid prescriptions for atypicals are also lower (0.43 vs 0.51) compared with those in states without such regulations.

Impact of Prior Authorization on Imprisonment of Those With Schizophrenia

In Table 2, we observed a slightly higher percentage of inmates with prior diagnoses of schizophrenia, and with symptoms of psychosis, in states that instituted prior au-

Table 2. Summary Statistics for Atypical Regulation and Utilization and Inmates (weighted)

Characteristics	All Population	PA States	Non PA States	PA Status Unknown
Any symptoms of psychosis	17.00% [0.376]	17.80% [0.382]	17.00% [0.376]	16.20% [0.369]
Diagnosed with schizophrenia	4.50% [0.207]	5.05% [0.219]	4.34% [0.204]	4.41% [0.205]
PA on atypicals in inmate's state	25.2%	100.0%	0.0%	NA
Medicaid prescriptions per capita for atypicals in inmate's state	0.5 [0.192]	0.431 [0.181]	0.515 [0.194]	0.529 [0.179]
Prevalence of serious mental illness in inmate's state	11.59 [0.950]	10.95 [0.373]	11.74 [0.998]	11.84 [0.922]
Age: 20-29 y	32.0%	29.1%	32.3%	34.2%
Age: 30-39 y	32.4%	34.6%	32.4%	30.2%
Age: 40-49 y	23.7%	24.9%	23.4%	23.4%
Age: >50 y	10.1%	9.6%	10.2%	10.3%
Gender: male	93.3%	93.8%	93.2%	93.3%
Race: white	47.0%	48.1%	45.3%	51.8%
Race: black	44.4%	36.0%	49.1%	38.1%
Race: other	8.6%	15.9%	5.6%	10.1%
Born in United States	90.9%	81.5%	93.5%	93.1%
High school completed	40.3%	45.0%	37.6%	44.0%
Lived with parents growing up	95.0%	93.5%	95.6%	94.8%
Sexually abused as child	4.8%	4.7%	4.5%	5.8%
Caretaker abused drugs or alcohol	32.4%	30.8%	32.0%	35.3%
Physically abused before admission	15.5%	14.7%	15.0%	17.9%
Violent crime	40.2%	42.4%	39.7%	39.5%
Drug offense, non-violent	26.0%	21.7%	28.0%	24.2%
Non-violent, non-drug	33.8%	35.9%	32.3%	36.3%
Observations	16,844	3,205	10,375	3,264
Represented inmate population	1,254,589	258,202	766,258	230,126

PA indicates prior authorization.

thorization despite a lower percentage of serious mental illness in the general population and a better educated prison population in these states.

Table 3, Panel A presents the results of a linear probability model of the presence of psychotic symptoms. The dependent variable indicates whether the inmate has been screened and determined to display symptoms of psychosis. The primary explanatory variable of interest in Table 3 is an indicator of whether that inmate's state of residence instituted prior authorization for atypicals in 2003. The explanatory variable of interest in **Table 4** is the per enrollee prescription of atypicals in that inmate's state Medicaid program in 2003. Column 1 estimates the linear probability model for the entire inmate population, and columns 2 to 4 limit the analysis to subsamples of inmates with violent crime, with drug offenses, or with nonviolent, nondrug offenses. Here and elsewhere, the coefficients on prior authorization are statistically significant in the "all inmates" group for both probit and logis-

tic regression models, in addition to the linear probability models reported.

Table 3, Panel A shows that the restrictive pharmacy policy variable is associated with higher likelihood that an imprisoned individual displays psychotic symptoms. The estimate shows that the probability an inmate displays symptoms increases by 2.7 percentage points [0.009-0.046] in a state with a prior authorization requirement for atypicals relative to a state without such a requirement. This demonstrates that prior authorization is associated with higher rates of incarceration. The point estimate for the violent crime population is very close to that estimated for the entire population; it is slightly larger for the nondrug, nonviolent population, but the difference between the 2 estimates is not statistically significant. The estimated rates for nonviolent crime are not statistically different in pre-approval and control states.

The association between prior authorization and psychotic symptoms is somewhat higher among the inmate

■ **Table 3, Panel A.** Results of Linear Probability Model Using Symptom-Based Screen for Psychosis

	Panel A: Any Symptoms of Psychosis							
	All Inmates		Violent Crime		Drug Offense, Non-violent		Non-drug, Non-violent	
	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI
PA on atypicals in inmate's state	0.027 ^a	(0.009-0.046)	0.030 ^a	(-0.005 to 0.065)	0.045 ^b	(0.005-0.084)	0.025	(-0.012 to 0.061)
Prevalence of serious mental illness in inmate's state	0.014 ^a	(0.006-0.022)	0.024 ^a	(0.008-0.040)	0.009	(-0.007 to 0.026)	0.005	(-0.011 to 0.021)
Age 20-29 y	-0.021	(-0.082 to 0.040)	-0.025	(-0.135 to 0.084)	0.033	(-0.099 to 0.165)	0.052	(-0.058 to 0.163)
Age 30-39 y	-0.017	(-0.079 to 0.044)	-0.020	(-0.129 to 0.090)	0.033	(-0.099 to 0.164)	0.063	(-0.047 to 0.173)
Age 40-49 y	-0.020	(-0.081 to 0.042)	-0.027	(-0.138 to 0.084)	0.039	(-0.094 to 0.172)	0.032	(-0.079 to 0.143)
Age >50 y	-0.049	(-0.112 to 0.014)	-0.107 ^c	(-0.218 to 0.004)	0.034	(-0.106 to 0.174)	0.048	(-0.070 to 0.166)
Gender: male	0.002	(-0.019 to 0.024)	-0.021	(-0.074 to 0.032)	-0.015	(-0.058 to 0.029)	-0.004	(-0.042 to 0.035)
Race: black	0.040 ^a	(0.025-0.055)	0.060 ^a	(0.030-0.090)	0.033 ^b	(0.001-0.064)	0.028 ^c	(-0.003 to 0.059)
Race: other	0.031 ^b	(0.002-0.059)	0.009	(-0.041 to 0.059)	0.092 ^a	(0.024-0.159)	0.020	(-0.037 to 0.078)
Born in United States	0.032 ^a	(0.009-0.056)	0.032	(-0.013 to 0.077)	0.027	(-0.017 to 0.070)	0.003	(-0.050 to 0.056)
High school completed	-0.033 ^a	(-0.047 to -0.019)	-0.044 ^a	(-0.072 to -0.016)	-0.037 ^a	(-0.066 to -0.009)	-0.045 ^a	(-0.073 to -0.016)
Lived with parents growing up	-0.069 ^a	(-0.108 to -0.030)	-0.057	(-0.125 to 0.012)	-0.073	(-0.163 to 0.017)	-0.063	(-0.140 to 0.014)
Caretaker abused drugs or alcohol	0.052 ^a	(0.035-0.068)	0.044 ^b	(0.010-0.077)	0.041 ^b	(0.006-0.076)	0.049 ^a	(0.017-0.081)
Sexually abused as child	0.120 ^a	(0.078-0.162)	0.116 ^a	(0.047-0.184)	0.166 ^a	(0.052-0.280)	0.094 ^b	(0.007-0.182)
Ever physically abused before admission	0.108 ^a	(0.082-0.133)	0.138 ^a	(0.090-0.186)	0.076 ^b	(0.017-0.134)	0.105 ^a	(0.054-0.157)
Constant	0.009	(-0.112 to 0.131)	-0.063	(-0.296 to 0.171)	0.005	(-0.251 to 0.260)	0.076	(-0.164 to 0.315)
Observations	13,101		3453		2598		3563	
R ²	0.037		0.059		0.035		0.033	

^a $P < 0.01$, ^b $P < 0.05$, ^c $P < 0.1$

The reference category for the race variable is "white." PA indicates prior authorization.

population with drug offenses, although this difference is not robust across alternative approaches to measuring the outcome of interest.

All personal experience factors included in these models proved to be significant and influential: growing up with at least 1 parent and completing high school are associated with a reduced risk of psychotic symptoms, but parents' substance abuse, sexual abuse in childhood, and physical abuse are all associated with an increased risk of psychotic symptoms. Relative to white inmates, African American inmates have an increased risk of symptoms in prison, as do other minorities, but age and gender did not prove significant.

In Table 3, Panel B, we re-estimate the model using the physician diagnosis-based measure. Consistent with the fact that the prevalence of physician diagnosis is lower, the estimated associations are also smaller in magnitude but still statistically significant and quite meaningful on a percentage basis. For example, the likelihood that an inmate has been diagnosed with schizophrenia increases by 1.2 percentage points [CI, 0.002-0.023]. The number rises to 2 percentage points [CI, 0.000-0.039] for violent crime and 2.2 percentage points [CI, 0.000-0.045] for nonviolent

non-drug offenses. The latter results are statistically significant at the 10% level, but insignificant at the 5% level. (The lower limits of the 2 confidence intervals are rounded up to zero.) Recall that the mean prevalence of previous physician diagnosis was around 5%, suggesting that, for example, a 1.2% increase corresponds to roughly a 24% increase.

Impact of Atypical Utilization on Imprisonment of Those With Schizophrenia

We have examined the most common method of reducing atypical use: requiring prior approval. For confirmation of these results, we examined whether broader use of atypicals affects the prevalence of diagnosed schizophrenia and psychotic symptoms in the state's prison population. Our estimation model is similar to those used in Table 3, although we removed our prior approval control and included the number of atypicals per capita for the state's Medicaid population. This approach increased our sample size, because we did not need to identify the specific state's regulation in 2003 and could include all states in the analysis. Table 4, Panel A, shows that a decrease in the variable measuring utilization of atypical antipsychot-

Table 3, Panel B. Results of Linear Probability Model Using Diagnosis-Based Screen for Schizophrenia

Panel B: Diagnosed With Schizophrenia								
	All Inmates		Violent Crime		Drug Offense, Non-violent		Non-drug, Non-violent	
	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI
PA on atypicals in inmate's state	0.012 ^b	(0.002-0.023)	0.020 ^c	(-0.000 to 0.039)	0.011	(-0.006 to 0.028)	0.022 ^c	(-0.000 to 0.045)
Prevalence of serious mental illness in inmate's state	0.003	(-0.001 to 0.008)	0.009 ^c	(-0.000 to 0.018)	0.004	(-0.005 to 0.014)	-0.001	(-0.010 to 0.008)
Age 20-29 y	0.007	(-0.016 to 0.031)	0.020	(-0.014 to 0.054)	0.016 ^a	(0.004-0.028)	0.020	(-0.033 to 0.072)
Age 30-39 y	0.021 ^c	(-0.003 to 0.044)	0.031 ^c	(-0.003 to 0.065)	0.030 ^a	(0.015-0.045)	0.023	(-0.030 to 0.076)
Age 40-49 y	0.042 ^a	(0.017-0.067)	0.061 ^a	(0.022-0.099)	0.024 ^a	(0.009-0.038)	0.036	(-0.018 to 0.090)
Age >50 y	0.023 ^c	(-0.003 to 0.049)	0.026	(-0.012 to 0.063)	0.025 ^b	(0.000-0.051)	0.030	(-0.029 to 0.088)
Gender: male	0.017 ^b	(0.004-0.030)	0.005	(-0.028 to 0.038)	0.003	(-0.019 to 0.024)	0.015	(-0.010 to 0.041)
Race: black	0.004	(-0.004 to 0.013)	0.010	(-0.008 to 0.027)	0.014 ^b	(0.000-0.028)	-0.001	(-0.019 to 0.017)
Race: other	0.003	(-0.012 to 0.018)	0.005	(-0.024 to 0.034)	0.015	(0.011-0.040)	0.006	(-0.029 to 0.041)
Born in United States	0.025 ^a	(0.015-0.036)	0.012	(-0.014 to 0.037)	0.020 ^a	(0.009-0.031)	0.031 ^a	(0.009-0.053)
High school completed	-0.008 ^c	(-0.016 to 0.001)	-0.012	(-0.028 to 0.004)	-0.016 ^a	(-0.027 to 0.004)	-0.002	(-0.019 to 0.015)
Lived with parents growing up	-0.041 ^a	(-0.067 to -0.014)	-0.015	(-0.056 to 0.026)	-0.054 ^c	(-0.112 to 0.005)	-0.038	(-0.094 to 0.017)
Caretaker abused drugs or alcohol	0.018 ^a	(0.008-0.027)	0.024 ^b	(0.004-0.044)	0.015 ^c	(-0.001 to 0.031)	0.021 ^b	(0.001-0.041)
Sexually abused as child	0.057 ^a	(0.027-0.087)	0.045 ^c	(-0.003 to 0.093)	0.061	(-0.014 to 0.136)	0.076 ^b	(0.009-0.143)
Ever physically abused before admission	0.049 ^a	(0.033-0.066)	0.048 ^a	(0.018-0.078)	0.011	(-0.019 to 0.041)	0.047 ^a	(0.012-0.081)
Constant	-0.032	(-0.096 to 0.032)	-0.109 ^c	(-0.228 to 0.011)	-0.032	(-0.147 to 0.082)	0.006	(-0.131 to 0.143)
Observations	13,139		3464		2605		3570	
R ²	0.026		0.027		0.025		0.026	

^aP < .01, ^bP < .05, ^cP < .1
The reference category for the race variable is "white." PA indicates prior authorization.

ics is associated with higher likelihood of psychotic symptoms among the imprisoned population. We find a similar impact when we confine the sample to inmates with non-violent drug offenses. The effects of the control variables were similar to those seen in the earlier analysis studying prior authorization rules. As shown in Table 4, Panel B, the results for physician-diagnosed schizophrenia are similar, and (as before) smaller in magnitude. Higher usage of atypicals is associated with higher likelihood of prior physician diagnosis of schizophrenia in the full sample, among violent offenders, and among those arrested for nonviolent, nondrug crimes. The coefficients on atypical usage are also statistically significant in the "all inmates" group for both probit and logistic regression models, in addition to the linear probability models reported.

LIMITATIONS

There are several limitations to the study, mostly resulting from the cross-sectional nature of the survey. Although we have controlled for a number of individual character-

istics, it is still possible that the states with prior authorization requirements differ in some systematic way from those without in their willingness to incarcerate schizophrenic residents. It is relevant to note here that states with prior authorization requirements displayed lower schizophrenia prevalence in the general population, but higher prevalence within the incarcerated population. Moreover, states with lower atypical usage rates also displayed higher prevalence of psychotic symptoms and diagnosed schizophrenia within the incarcerated population; this result is identified across a broader set of states than just the ones with prior authorization. It is not obvious what causal mechanisms would account for all these results, although the cross-sectional data cannot rule out such mechanisms directly.

The second limitation is that our 2 survey-based screens rely either on self-reported symptoms that include psychoses other than schizophrenia, or on recollection of a physician diagnosis. The former may be overinclusive, while the latter may exclude some undiagnosed cases or patients who cannot accurately recall a diagnosis. It is nonetheless encouraging that results are reasonably robust across the measures.

■ **Table 4, Panel A.** Results of Linear Probability Model Using Symptom-Based Screen for Psychosis

	Panel A: Any Symptoms of Psychosis							
	All Inmates		Violent Crime		Drug Offense, Non-violent		Non-drug, Non-violent	
	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI
Medicaid prescriptions per capita for atypicals in inmate's state	-0.053 ^a	(-0.086 to -0.021)	-0.043	(-0.107 to 0.022)	-0.077 ^b	(-0.142 to -0.012)	-0.029	(-0.096 to 0.038)
Prevalence of serious mental illness in inmate's state	0.015 ^a	(0.008-0.022)	0.026 ^a	(0.012-0.040)	0.002	(-0.012 to 0.015)	0.007	(-0.006 to 0.020)
Age 20-29 y	-0.030	(-0.085 to 0.025)	-0.018	(-0.114 to 0.079)	0.045	(-0.078 to 0.168)	-0.024	(-0.130 to 0.082)
Age 30-39 y	-0.027	(-0.082 to 0.028)	-0.014	(-0.111 to 0.083)	0.031	(-0.091 to 0.154)	-0.009	(-0.115 to 0.097)
Age 40-49 y	-0.030	(-0.085 to 0.025)	-0.019	(-0.118 to 0.079)	0.026	(-0.098 to 0.149)	-0.031	(-0.138 to 0.075)
Age > 50 y	-0.053 ^c	(-0.110 to 0.004)	-0.080	(-0.179 to 0.019)	0.033	(-0.097 to 0.162)	-0.020	(-0.132 to 0.091)
Gender: male	-0.004	(-0.024 to 0.015)	-0.031	(-0.080 to 0.017)	-0.028	(-0.067 to 0.011)	-0.004	(-0.040 to 0.032)
Race: black	0.035 ^a	(0.022-0.049)	0.050 ^a	(0.023-0.076)	0.021	(-0.007 to 0.049)	0.031 ^b	(0.004-0.058)
Race: other	0.035 ^a	(0.010-0.059)	0.028	(-0.017 to 0.073)	0.075 ^b	(0.018-0.133)	0.028	(-0.021 to 0.076)
Born in United States	0.024 ^b	(0.003-0.045)	0.023	(-0.018 to 0.064)	0.020	(-0.018 to 0.059)	-0.006	(-0.053 to 0.040)
High school completed	-0.028 ^a	(-0.041 to -0.015)	-0.035 ^a	(-0.060 to -0.010)	-0.032 ^b	(-0.058 to -0.007)	-0.030 ^b	(-0.055 to -0.005)
Lived with parents growing up	-0.068 ^a	(-0.102 to -0.033)	-0.046	(-0.105 to 0.014)	-0.073 ^c	(-0.155 to 0.010)	-0.071 ^b	(-0.138 to -0.003)
Caretaker abused drugs or alcohol	0.047 ^a	(0.032-0.062)	0.036 ^b	(0.006-0.065)	0.043 ^a	(0.012-0.073)	0.049 ^a	(0.021-0.078)
Sexually abused as child	0.130 ^a	(0.093-0.167)	0.121 ^a	(0.061-0.181)	0.129 ^a	(0.032-0.226)	0.138 ^a	(0.058-0.217)
Ever physically abused before admission	0.111 ^a	(0.089-0.134)	0.134 ^a	(0.092-0.175)	0.065 ^b	(0.013-0.117)	0.124 ^a	(0.079-0.169)
Constant	0.057	(-0.047 to 0.161)	-0.065	(-0.265 to 0.136)	0.162	(-0.055 to 0.379)	0.146	(-0.053 to 0.346)
Observations	16,258		4338		3193		4508	
R ²	0.039		0.052		0.030		0.043	

^a $P < 0.01$, ^b $P < 0.05$, ^c $P < 0.1$

The reference category for the race variable is "white."

Third, we do not directly observe the mechanism that runs between prior authorization and incarceration. Ideally, one would observe that prior authorization leads to lower medication use among patients with disease, and this is then associated with higher rates of incarceration. Because we do not observe in any data the change in prisoners' medication use before and after the adoption of prior authorization, it is not possible to test for this mechanism. As a result, our results are suggestive of this mechanism, but do not demonstrate it explicitly.

Finally, we note that there are a number of unmeasured factors that affect rates of imprisonment, above and beyond the formulary policies studied. This is demonstrated by the relatively low R^2 values in our estimated models.

POLICY IMPLICATIONS

We found that prior authorization requirements for the use of atypical antipsychotics in states' Medicaid coverage

are associated with an increased likelihood that an imprisoned resident will display psychotic symptoms or report a prior diagnosis of schizophrenia. We found a similar association using the number of atypical prescriptions per capita.

Prior authorization policies were instituted to reduce spending in state Medicaid programs by steering utilization to lower-cost medications and by assisting Medicaid programs in negotiating rebates with pharmaceutical companies. This study contributes to the discussion of costs and benefits of a prior authorization policy by providing some direct evidence on the nonmedical costs of prior authorization related to increased contact with law enforcement. The analysis suggests that prior authorization and the associated reduction in atypical use may cause increased imprisonment of schizophrenic persons. The total annual cost in the United States associated with severe psychiatric disorders in jails and prisons is estimated by the Department of Justice's Source Book of Criminal Justice Statistics¹¹ to be \$8.5 billion (based on an estimated

■ **Table 4, Panel B.** Results of Linear Probability Model Using Diagnosis-Based Screen for Psychosis

	Panel B: Diagnosed With Psychosis							
	All Inmates		Violent Crime		Drug Offense, Non-violent		Non-drug, Non-violent	
	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI
Medicaid prescriptions per capita for atypicals in inmate's state	-0.027 ^a	(-0.045 to -0.008)	-0.037 ^b	(-0.075 to -0.000)	-0.017	(-0.046 to 0.013)	-0.044 ^b	(-0.081 to -0.006)
Prevalence of serious mental illness in inmate's state	0.003	(-0.001 to 0.006)	0.008 ^c	(-0.000 to 0.016)	0.004	(-0.003 to 0.011)	-0.002	(-0.009 to 0.006)
Age 20-29 y	0.002	(-0.021 to 0.024)	0.018	(-0.010 to 0.046)	0.018 ^a	(0.006-0.030)	-0.017	(-0.075 to 0.042)
Age 30-39 y	0.015	(-0.008 to 0.038)	0.030 ^b	(0.001 to 0.059)	0.028 ^a	(0.013-0.043)	-0.005	(-0.064 to 0.054)
Age 40-49 y	0.034 ^a	(0.011-0.058)	0.058 ^a	(0.026 to 0.091)	0.026 ^a	(0.011-0.040)	0.008	(-0.052 to 0.068)
Age >50 y	0.014	(-0.011 to 0.038)	0.023	(-0.009 to 0.055)	0.018 ^c	(-0.003 to 0.039)	-0.001	(-0.064 to 0.061)
Gender: male	0.009	(-0.003 to 0.021)	0.000	(-0.031 to 0.031)	-0.003	(-0.023 to 0.017)	0.012	(-0.012 to 0.036)
Race: black	0.001	(-0.007 to 0.008)	0.005	(-0.010 to 0.020)	0.003	(-0.009 to 0.016)	-0.003	(-0.019 to 0.013)
Race: other	-0.003	(-0.016 to 0.009)	0.005	(-0.020 to 0.030)	0.008	(-0.016 to 0.032)	-0.004	(-0.031 to 0.023)
Born in United States	0.020 ^a	(0.010-0.030)	0.014	(-0.008 to 0.035)	0.011	(-0.003 to 0.025)	0.024 ^a	(0.006 to 0.043)
High school completed	-0.007 ^c	(-0.014 to 0.000)	-0.011	(-0.025 to 0.004)	-0.015 ^a	(-0.026 to -0.004)	0.000	(-0.015 to 0.015)
Lived with parents growing up	-0.037 ^a	(-0.060 to -0.015)	-0.017	(-0.053 to 0.018)	-0.060 ^b	(-0.118 to -0.002)	-0.034	(-0.081 to 0.014)
Caretaker abused drugs or alcohol	0.017 ^a	(0.008-0.025)	0.018 ^b	(0.000-0.035)	0.015 ^b	(0.000-0.031)	0.019 ^b	(0.002-0.037)
Sexually abused as child	0.055 ^a	(0.029-0.081)	0.038 ^c	(-0.002 to 0.078)	0.064 ^b	(0.002-0.127)	0.083 ^a	(0.022-0.144)
Ever physically abused before admission	0.051 ^a	(0.037-0.066)	0.051 ^a	(0.025-0.078)	0.008	(-0.019 to 0.035)	0.054 ^a	(0.024-0.084)
Constant	0.009	(-0.046 to 0.064)	-0.064	(-0.169 to 0.041)	0.015	(-0.080 to 0.109)	0.076	(-0.043 to 0.194)
Observations	16,308		4352		3204		4516	
R ²	0.026		0.026		0.022		0.031	

^aP < .01, ^bP < .05, ^cP < .1
The reference category for the race variable is "white."

cost of \$50,000 per ill inmate per year, with about 170,000 individuals with serious psychiatric disorders kept in jails and prisons). Adding to this expense are court costs, attorney fees, police costs, and costs of other social and medical services, suggesting that the criminal justice system is a very expensive way to deal with mental illness.

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eAppendix A. States by Policy Status

Prior Authorization	Non-Prior Authorization	Unknown Prior Authorization
AK	AL	CO
CA	AR	CT
MA	FL	DC
NY	IA	DE
	IL	GA
	IN	HI
	KS	ID
	KY	MI
	LA	MT
	MD	ND
	ME	NE
	MN	NV
	MO	OK
	MS	OR
	NC	RI
	NH	SD
	NJ	UT
	NM	VT
	OH	WV
	PA	WY
	SC	
	TX	
	VA	
	WI	

eAppendix B. Table 1, Panel A. Results of Logistic Regression Model Using Symptom-Based Screen for Psychosis

Panel A: Any Symptoms of Psychosis

	All Inmates		Violent Crime		Drug Offense, Nonviolent		Nondrug, Nonviolent	
	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI
PA on atypicals in inmate's state	1.220**	(1.067-1.394)	1.222	(0.968-1.542)	1.496*	(1.073-2.087)	1.210	(0.919-1.593)
Prevalence of serious mental illness in inmate's state	1.107***	(1.048-1.170)	1.159**	(1.054-1.275)	1.096	(0.943-1.274)	1.040	(0.923-1.173)
Age 20-29	0.867	(0.585-1.286)	0.857	(0.452-1.625)	1.425	(0.302-6.730)	1.521	(0.561-4.128)
Age 30-39	0.892	(0.601-1.323)	0.892	(0.471-1.690)	1.426	(0.302-6.736)	1.647	(0.609-4.455)
Age 40-49	0.880	(0.590-1.311)	0.855	(0.446-1.639)	1.515	(0.318-7.222)	1.286	(0.471-3.516)
Age > 50	0.688	(0.449-1.056)	0.432*	(0.212-0.878)	1.437	(0.283-7.291)	1.475	(0.511-4.256)
Gender: Male	1.013	(0.887-1.157)	0.893	(0.677-1.177)	0.885	(0.631-1.240)	0.976	(0.755-1.263)
Race: Black	1.336***	(1.194-1.495)	1.473***	(1.208-1.795)	1.372*	(1.007-1.868)	1.234	(0.973-1.565)
Race: Other	1.261*	(1.027-1.549)	1.058	(0.736-1.521)	2.173**	(1.327-3.560)	1.166	(0.768-1.771)
Born in US	1.336**	(1.078-1.655)	1.326	(0.900-1.952)	1.321	(0.825-2.117)	1.028	(0.660-1.603)
High School completed	0.782***	(0.700-0.872)	0.742**	(0.610-0.902)	0.693*	(0.523-0.920)	0.703**	(0.559-0.884)
Lived with parents growing up	0.672***	(0.544-0.829)	0.741	(0.519-1.058)	0.610	(0.350-1.063)	0.684	(0.444-1.051)
Caretaker abused drug or alcohol	1.424***	(1.273-1.593)	1.311**	(1.069-1.607)	1.433*	(1.076-1.907)	1.431**	(1.140-1.797)
Sexually abused as child	1.878***	(1.532-2.301)	1.797***	(1.295-2.493)	2.519**	(1.416-4.482)	1.661*	(1.062-2.597)
Ever physically abused before admission	1.899***	(1.648-2.189)	2.134***	(1.665-2.736)	1.748**	(1.185-2.579)	1.950***	(1.449-2.625)
Constant	0.0548***	(0.024-0.124)	0.0404***	(0.010-0.164)	0.0319**	(0.003-0.390)	0.0857*	(0.013-0.558)
Observations	13,101		3453		2598		3563	
Pseudo R-squared	0.0372		0.0563		0.0405		0.0346	
Log pseudolikelihood	-436712.9		-137073.1		-68684.6		-100166.5	

*** $P < .01$, ** $P < 0.05$, * $P < .1$

Note: The reference category for the race variable is "white"; In "Drug Offense, Non-violent" group, "Age 50+" is removed in order to achieve convergence.

eAppendix B. Table 1, Panel B. Results of Logistic Regression Model Using Symptom-Based Screen for Schizophrenia

Panel B: Diagnosed With Schizophrenia

	All Inmates		Violent Crime		Drug Offense, Nonviolent		Nondrug, Nonviolent	
	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI
PA on atypicals in inmate's state	1.335*	(1.056-1.687)	1.507*	(1.019-2.227)	1.797	(0.847-3.813)	1.585	(0.998-2.517)
Prevalence of serious mental illness in inmate's state	1.085	(0.983-1.198)	1.194*	(1.018-1.400)	1.269	(0.887-1.817)	0.979	(0.776-1.235)
Age 20-29	1.308	(0.497-3.443)	2.311	(0.323-16.52)	0.777	(0.192-3.148)	1.759	(0.246-12.59)
Age 30-39	1.875	(0.715-4.913)	2.978	(0.419-21.17)	1.552	(0.398-6.054)	1.908	(0.267-13.65)
Age 40-49	2.891*	(1.104-7.569)	4.999	(0.703-35.57)	1.162	(0.295-4.583)	2.480	(0.345-17.83)
Age > 50	2.018	(0.744-5.478)	2.604	(0.348-19.50)	-		2.224	(0.289-17.09)
Gender: Male	1.340*	(1.050-1.711)	1.068	(0.662-1.722)	1.065	(0.478-2.372)	1.279	(0.804-2.035)
Race: Black	1.097	(0.895-1.346)	1.212	(0.846-1.737)	2.207*	(1.033-4.712)	0.949	(0.623-1.445)
Race: Other	1.069	(0.719-1.589)	1.093	(0.573-2.085)	2.627	(0.781-8.836)	1.134	(0.537-2.395)
Born in US	2.607***	(1.526-4.454)	1.418	(0.652-3.086)	-		2.911	(0.984-8.609)
High School completed	0.825	(0.677-1.007)	0.776	(0.545-1.105)	0.408**	(0.206-0.807)	0.945	(0.640-1.394)
Lived with parents growing up	0.539***	(0.386-0.754)	0.782	(0.434-1.411)	0.286**	(0.118-0.695)	0.564	(0.280-1.134)
Caretaker abused drug or alcohol	1.481***	(1.205-1.819)	1.608*	(1.112-2.324)	1.839	(0.973-3.473)	1.557*	(1.037-2.340)
Sexually abused as child	1.997***	(1.449-2.753)	1.695	(0.999-2.877)	3.345*	(1.007-11.12)	2.307**	(1.221-4.356)
Ever physically abused before admission	2.283***	(1.785-2.921)	2.089***	(1.371-3.183)	1.444	(0.564-3.692)	2.109**	(1.292-3.444)
Constant	0.00337***	(0.000-0.016)	0.00109***	(0.000-0.017)	0.00192**	(0.000-0.175)	0.00922*	(0.000-0.372)
Observations	13,139		3464		2295		3570	
R-squared	0.0583		0.0578		0.0827		0.0563	
Log pseudolikelihood	-171509.1		-55847.0		-17628.4		-42592.4	

*** $P < .01$, ** $P < .05$, * $P < .1$

Note: The reference category for the race variable is "white"; In "Drug Offense, Non-violent" group, "Age 50+" is removed in order to achieve convergence.

eAppendix C. Table 1, Panel A. Results of Logistic Regression Model Using Symptom-Based Screen for Psychosis**Panel A: Any Symptoms of Psychosis**

	All Inmates		Violent Crime		Drug Offense, Nonviolent		Nondrug, Nonviolent	
	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI
Medicaid prescriptions per capita for Atypicals in inmate's state	0.673**	(0.524-0.866)	0.759	(0.486-1.184)	0.490*	(0.259-0.925)	0.788	(0.461-1.345)
Prevalence of serious mental illness in inmate's state	1.111***	(1.059-1.165)	1.177***	(1.082-1.280)	1.019	(0.897-1.158)	1.055	(0.958-1.162)
Age 20-29	0.816	(0.574-1.160)	0.897	(0.491-1.638)	1.614	(0.346-7.528)	0.842	(0.409-1.734)
Age 30-39	0.836	(0.588-1.190)	0.920	(0.503-1.681)	1.433	(0.307-6.691)	0.947	(0.460-1.949)
Age 40-49	0.819	(0.573-1.170)	0.891	(0.482-1.644)	1.357	(0.288-6.388)	0.792	(0.381-1.647)
Age > 50	0.678*	(0.463-0.992)	0.549	(0.286-1.052)	1.444	(0.291-7.155)	0.870	(0.397-1.906)
Gender: Male	0.980	(0.869-1.105)	0.861	(0.669-1.108)	0.810	(0.598-1.098)	0.970	(0.766-1.228)
Race: Black	1.295***	(1.170-1.433)	1.383***	(1.156-1.654)	1.230	(0.936-1.616)	1.278*	(1.033-1.581)
Race: Other	1.292**	(1.082-1.543)	1.207	(0.883-1.648)	1.882**	(1.225-2.891)	1.236	(0.865-1.766)
Born in US	1.239*	(1.023-1.500)	1.226	(0.867-1.734)	1.230	(0.808-1.873)	0.951	(0.640-1.415)
High School completed	0.807***	(0.732-0.891)	0.789**	(0.663-0.938)	0.729*	(0.567-0.936)	0.787*	(0.644-0.964)
Lived with parents growing up	0.673***	(0.557-0.812)	0.783	(0.568-1.078)	0.608	(0.365-1.011)	0.650*	(0.444-0.950)
Caretaker abused drug or alcohol	1.389***	(1.255-1.536)	1.256*	(1.047-1.508)	1.444**	(1.120-1.860)	1.451***	(1.182-1.781)
Sexually abused as child	1.967***	(1.644-2.352)	1.839***	(1.381-2.447)	2.116**	(1.252-3.576)	2.014***	(1.378-2.944)
Ever physically abused before admission	1.958***	(1.725-2.222)	2.120***	(1.704-2.639)	1.632**	(1.137-2.342)	2.186***	(1.692-2.824)
Constant	0.0775***	(0.039-0.155)	0.0401***	(0.012-0.135)	0.139	(0.015-1.274)	0.149**	(0.035-0.623)
Observations	16,258		4338		3193		4508	
R-squared	0.0381		0.0493		0.0348		0.0433	
Pseudo loglikelihood	-531576.5		-168251.7		-83741.2		-124479.1	

*** $P < .01$, ** $P < .05$, * $P < .1$

Note: The reference category for the race variable is "white"; In "Drug Offense, Non-violent" group, "Age 50+" is removed in order to achieve convergence.

eAppendix C. Table 1, Panel B. Results of Logistic Regression Model Using Symptom-Based Screen for Schizophrenia

Panel B: Diagnosed With Schizophrenia

	All Inmates		Violent Crime		Drug Offense, Non-violent		Non-drug, Non-violent	
	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI
Medicaid prescriptions per capita for Atypicals in inmate's state	0.518**	(0.323-0.830)	0.459	(0.196-1.072)	0.413	(0.0947-1.799)	0.325*	(0.118-0.896)
Prevalence of serious mental illness in inmate's state	1.067	(0.979-1.161)	1.165*	(1.006-1.349)	1.172	(0.904-1.518)	0.970	(0.805-1.169)
Age 20-29	1.065	(0.477-2.382)	2.555	(0.363-17.99)	1.298	(0.331-5.099)	0.644	(0.190-2.179)
Age 30-39	1.536	(0.690-3.420)	3.365	(0.480-23.59)	2.018	(0.532-7.653)	0.875	(0.261-2.927)
Age 40-49	2.288*	(1.028-5.094)	5.540	(0.789-38.89)	1.827	(0.478-6.987)	1.152	(0.343-3.873)
Age > 50	1.503	(0.651-3.472)	2.844	(0.390-20.74)	-	-	0.947	(0.258-3.479)
Gender: Male	1.174	(0.948-1.455)	1.019	(0.656-1.583)	0.936	(0.485-1.807)	1.200	(0.789-1.823)
Race: Black	1.007	(0.838-1.210)	1.096	(0.794-1.513)	1.194	(0.679-2.101)	0.919	(0.626-1.351)
Race: Other	0.891	(0.621-1.278)	1.069	(0.596-1.920)	1.439	(0.541-3.826)	0.902	(0.442-1.840)
Born in US	2.146**	(1.356-3.397)	1.566	(0.735-3.337)	2.164	(0.648-7.232)	2.782	(0.954-8.115)
High School completed	0.844	(0.707-1.007)	0.791	(0.578-1.083)	0.471*	(0.265-0.839)	0.993	(0.702-1.403)
Lived with parents growing up	0.550***	(0.407-0.744)	0.759	(0.450-1.279)	0.275**	(0.124-0.610)	0.579	(0.308-1.090)
Caretaker abused drug or alcohol	1.463***	(1.215-1.761)	1.435*	(1.030-1.998)	1.822*	(1.054-3.149)	1.542*	(1.063-2.235)
Sexually abused as child	1.939***	(1.469-2.560)	1.573	(0.989-2.503)	3.092*	(1.206-7.928)	2.446**	(1.430-4.185)
Ever physically abused before admission	2.389***	(1.919-2.974)	2.285***	(1.572-3.320)	1.280	(0.564-2.907)	2.411***	(1.568-3.706)
Constant	0.0103***	(0.003-0.038)	0.00218***	(0.000-0.0279)	0.00502**	(0.000-0.152)	0.0468*	(0.003-0.721)
Observations	16,308		4352		3204		4516	
R-squared	0.0583		0.0560		0.0722		0.0657	
Pseudo loglikelihood	-209009.2		-68049.2		-23778.1		-52202.5	

***P <.01, **P <.05, *P <.1

Note: The reference category for the race variable is "white"; In "Drug Offense, Non-violent" group, "Age 50+" is removed in order to achieve convergence.