Published in final edited form as:

Child Abuse Negl. 2014 June ; 38(6): 1002–1010. doi:10.1016/j.chiabu.2014.02.013.

Racial/Ethnic Differences in Medicaid Expenditures on Psychotropic Medications among Maltreated Children

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Abstract

This study quantifies racial/ethnic differences in Medicaid expenditures on psychotropic drugs among a national sample of children with suspected maltreatment. We linked 4,445 child participants in the National Survey of Child and Adolescent Well-Being (NSCAW) – consisting of children investigated for suspected abuse and neglect - to their Medicaid claims obtained from 36 states. We used propensity score matching to construct a comparison group of children without known child welfare involvement, and estimated two-part generalized linear models to examine differences in annual psychotropic drug expenditures per child between children of different races/ethnicities. When compared to a matched sample of children, African American and Latino children incur \$292 and \$144 less expenditures on psychotropic drugs, respectively, than white children. Among NSCAW children alone, African American children display \$614 less spending on psychotropic drugs when compared to white children. Racial/ethnic differences in expenditures on psychotropic drugs occur among all children on Medicaid, but the differences are especially pronounced among African American children in contact with the child welfare system. These findings demonstrate that policymakers will need to pay special attention to the needs of children of color as Medicaid expansions proceed nationwide.

Keywords

Psychotropic Drugs; Disparities; Medicaid; Expenditures; Race; Ethnicity

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INTRODUCTION

Child abuse and neglect (collectively, maltreatment) are major public health challenges in the United States today. This is for two principal reasons. First, a large number of children and youth are victims of abuse or neglect; in federal fiscal year 2011, around 6 million children were reported to child welfare/child protection agencies nationwide for suspected child maltreatment (U.S. Department of Health and Human Services, 2012). Second, these children bear what is perhaps the greatest burden of mental disorder among all child populations. Over 80% of maltreated children in foster care were reported to have either a developmental, emotional or behavioral disorder (Halfon, Mendonca, & Berkowitz, 1995), and 54.4% met clinical or borderline criteria for mental illness (Clausen, Landsverk, Ganger, Chadwick, & Litrownik, 1998). Up to half of all children coming into contact with child welfare agencies had clinically significant emotional or behavioral problems (Burns et al., 2004), suggesting a threefold increase in mental illness/symptoms among children involved with child welfare agencies compared to community-dwelling children.

Children with child welfare involvement receive medications at a rate between 2-3 times that of comparable children in the community (Raghavan et al., 2005). About 1 in 7 children in foster care receives a psychotropic drug at a given point in time (Zima, Bussing, Yang, & Belin, 2000), a rate that rises to nearly 1 in 4 when these children are followed over time (Leslie, Raghavan, Zhang, & Aarons, 2010). Approximately 40% of children in foster care reportedly received multiple psychotropic medications simultaneously (J. M. Zito et al., 2008) and used them for significantly longer than other children in the Medicaid program (dosReis et al., 2011). Cumulatively, children in the child welfare system are the largest consumers of psychotropic drugs among all child populations in the United States today.

These patterns reflect the trend of increasing rates of use of psychotropic drugs (such as antipsychotics) within the Medicaid child population, with use expanding to more diagnoses (Matone et al., 2012). Leaving aside questions of the appropriateness of such use, there are significant race/ethnic disparities in the use of psychotropic medications among this population. African American children consistently received medications at lower rates than white children, controlling for need (Leslie et al., 2003), and received fewer medications than white children (Raghavan & McMillen, 2008). African American children on Medicaid in Maryland had less than half the odds of being prescribed psychotropic medications compared to white children (Zito, Safer, dosReis, & Riddle, 1998).

Understanding how these differences in use translate into disparities in expenditures is critical for policy. Child maltreatment produces considerable economic burden for the country (Brown, Fang, & Florence, 2011; Fang, Brown, Florence, & Mercy, 2012), and imposes great health costs upon Medicaid (Florence, Brown, Fang, & Thompson, 2013). Prescription psychotropic drugs are the principal drivers of the growth in mental health spending (Fullerton et al., 2012), much of it is paid for by Medicaid. Absent information on expenditure disparities, state Medicaid agencies run the risk of inadvertently under-resourcing care for their most needy beneficiaries, and thus, potentially worsening mental health disparities. Understanding expenditure disparities is also critical for the successful implementation of the Medicaid expansion provisions of the Affordable Care Act; simply

increasing insurance coverage is unlikely to reduce disparities, as the prior literature suggests.

In this paper, we attempt to inform practice and policy of psychotropic medication expenditures for perhaps the most vulnerable of all child Medicaid beneficiaries, child victims of maltreatment. We have, for the first time in the history of Medicaid research, successfully linked national survey data to national Medicaid claims data. Our survey data – the first fielding of the National Survey of Child and Adolescent Well-Being (NSCAW-I) – permits assessment of the child’s mental status using standardized instruments. Linked to Medicaid claims data, this assessment of child need provides hitherto unprecedented information on the magnitude of racial/ethnic disparities in this population. Taken together, these findings provide a national picture of the nature and magnitude of expenditure disparities and differences at a highly salient time for Medicaid reform.

METHODS

Data Sources and Creation of Analytic Data Set

The NSCAW-I is the first nationally representative, longitudinal study of children and adolescents coming into contact with child protection agencies (Dowd et al., 2006; NSCAW Research Group, 2002). This sample contains data on 5,501 youth investigated by Child Protective Services for possible abuse and neglect and 727 youth in long-term foster care placement in 97 counties throughout the United States. NSCAW’s first wave was fielded between 1999 and 2001. We also obtained Medicaid claims files [Medicaid Analytic Extract or MAX (Research Data Assistance Center, n.d.)] for years 2000 through 2003. These years were chosen to parallel the time frame of NSCAW-I administration. We obtained data on all 36 states that were part of the NSCAW sampling frame.

We used social security numbers (SSNs) to link approximately half of all NSCAW children to Medicaid records. A total of 2,371 NSCAW youth were linked by SSN to Medicaid enrollment files. For NSCAW children without a SSN match but for whom permission to match was available, we developed an indirect matching procedure described below in which all unique 5-digit zip code, date of birth, gender, and race/ethnicity combinations were identified in NSCAW (based on sampling information) and in the MAX data (based on enrollment records). Our total linked NSCAW-MAX sample contained 4,445 children.

We linked these enrollment files to drug claims files (RX file) across four years, and aggregated individual claims within a single calendar year for a given NSCAW child. We deleted from our sample all children younger than 2 years at NSCAW wave 1 because the version of the Child Behavior Checklist (CBCL; Achenbach, 1992), which is the measure of need for mental health services used in NSCAW, is not normed for that age group. Children who were not enrolled in select Medicaid plan types—fee-for-service (FFS), primary care case management (PCCM), or “other” managed care plans with non-mental health care carve-out—for at least 10 months in a calendar year were also deleted because we observe only enrollment, not claims or services, for children in Medicaid managed care. Managed care rates differ substantially by state, so state dummy variables were used in all statistical analyses.

We generated a comparison sample of putatively non-child welfare-involved Medicaid beneficiaries using propensity score matching to the nearest neighbor (Caliendo & Kopeinig, 2008). We identified a cohort of Medicaid beneficiaries without any Medicaid codes for eligibility based upon foster care status across all years. We then matched them to NSCAW children using their age, gender, race/ethnicity, year of data, Medicaid plan type, and zip code of residence. The final sample size included 9,402 child observations over four years, 4,701 each in the NSCAW and the matched samples.

Medicaid Expenditures on Psychotropic Medications

First, we used codes from Medicaid RX (MRX; Gilmer, Kronick, Fishman, & Ganiats, 2001), to aggregate drugs by indications of attention-deficit disorder, depression/anxiety, psychotic illness/bipolar, and seizure disorder (which contains anticonvulsants). MRX uses Medicaid pharmacy data to classify individuals into one or more of 45 medical conditions based on their demographics and prescription drug use. Second, we used drug categories from the Red Book (Truven Health Analytics, n.d.) to present information on drug classes of relevance to psychiatric practice. Red Book is an industry-standard reference that contains details on over 200,000 prescription drugs, over-the-counter drugs, nutritional supplements, and bulk chemicals. It includes information on drug (pharmaceutical) classes, into which individual MAX drugs can be aggregated. We purposively selected mental health-relevant MRX and Red Book categories, so results from these two approaches are not expected to be equivalent. Outcomes are measured as mean total annual Medicaid expenditure per child.

Covariates

Except where otherwise noted, all NSCAW variables were obtained from the child's primary caregiver. Child-level covariates included age, gender, and race/ethnicity. Identification of behavioral problems was based on whether the child scored in the clinical range (t score of 64 or greater) on the internalizing or externalizing scales of the Child Behavior Check List (CBCL) (Achenbach, 1992), a well-established measure of mental health need among child welfare populations (Raghavan, Inoue, Ettner, Hamilton, & Landsverk, 2010; Raghavan, Lama, Kohl, & Hamilton, 2010; Raghavan et al., 2005). Categories of physical abuse, sexual abuse, neglect, and abandonment were obtained from caseworkers, and dichotomized such that a child could have more than one type of abuse coded. We also used a binary indicator variable representing "fair" or "poor" physical health, with "excellent," "very good," or "good" as a referent, reported by the child's caregiver.

Each child's placement status was grouped into two mutually exclusive categories of in-home (i.e., living with their permanent primary caregiver, usually their birthparent) and out-of-home (in family foster care – either with a relative or nonrelative – or in congregate care, such as a group home or residential treatment center). Information on whether the child lived in an urban or rural area was obtained from NSCAW data as a control for the availability of health care resources in the child's community. We also included dummy variables for insurance type (FFS, PCCM, or other types) from the Medicaid enrollment files. All covariates were measured at baseline, except insurance type, which is measured at the child-observation (i.e., calendar year) level for an individual child.

Analyses

We first obtained an aggregate expenditure figure per child per year, for both NSCAW and comparison samples, and adjusted all expenditures to 2010 dollars following guidelines from the Agency for Healthcare Research and Quality (Agency for Healthcare Research and Quality, n.d.) and Centers for Medicare and Medicaid Services (U.S. Department of Health and Human Services Centers, 2008). Bivariate analyses showing mean differences in rates of annual use of and expenditures on psychotropic medications between NSCAW and comparison group children were performed using a two-sample proportions and *t*-tests.

Differences in psychotropic medication expenditures between NSCAW and comparison group children were examined using a two-part model with expenditures per child per year as its outcome (Duan, Manning, Morris, & Newhouse, 1984). In the first part we used logistic regression to estimate the annual probability of having any medication expenditures, and in the second part we used a generalized linear model (GLM) with a log link and a gamma distribution (essentially a regression model of log annual expenditures among children with non-zero expenditures; Manning, Basu, & Mullahy, 2005). We then focused only on NSCAW children and estimated similar models on this sample (3,520 child-observations after some missing values) to examine the association between NSCAW's rich set of explanatory variables and expenditures. We developed predictive margins for significant coefficients from the second part of our models in an attempt to increase their interpretability. Predictive margins of expenditures for an African American race/ethnicity coefficient, for example, are the average difference in expenditures between African-American children and whites, controlling for the other variables in the model.

Although the NSCAW data come with a set of survey weights, we report unweighted expenditure data in keeping with prior literature (Raghavan et al., 2012). All models include corrections for the clustering of multiple years' worth of expenditure observations per child. We also include state dummies to control for unobserved state-level variables that might affect expenditures for all children within a given state (as discussed), and year dummies to control for secular trends (not shown in tables). All analyses were performed in Stata version 13 (StataCorp, 2013). This study was approved by the institutional review boards at Washington University in St. Louis and at the Research Triangle Institute.

RESULTS

Table 1 shows the unadjusted expenditures incurred by children of different race/ethnicities by indication (as obtained from the MRX classification) and by type of drug (as obtained from the Red Book). Twenty-two percent of white children, 17.5% of African American children, 17.1% of Hispanic children, and 24.0% of children of other race/ethnicities received a medication. Overall psychotropic drug expenditures using the MRX classification were significantly higher among white children (\$1,456) when compared to African American children (\$1,298; $p < 0.001$). Results of differences in pharmaceutical class (as measured by Red Book classifications) are generally consistent with the MRX classifications. African American-white expenditure differences were \$174, while Hispanic and children of other race/ethnicities continued to display higher expenditures on their medications. The most statistically significant expenditure differences between African

American and white children were for drugs used to treat attention deficit/hyperactivity disorder (ADHD; on the MRX classification), amphetamine stimulants, and benzodiazepines (on the Red Book classification).

Differences in Medicaid drug expenditures between NSCAW and comparison group children are further analyzed in Table 2. Odds ratios from Part 1 of the model indicate the odds of having any use (therefore, incurring any expenditures) on any psychotropic medication. (In the interests of brevity, we only show results from the MRX classification; there are no appreciable differences in the results from the Red Book classification.) Children interviewed in the NSCAW study had nearly twice the odds of incurring any psychotropic medication expenditures than did children in the comparison group (Part I of the model; $OR = 1.9$; $p < .001$). Boys had 90% greater odds of medication use ($p < .001$), and children of older ages had significantly greater odds of use of psychotropic medications than those ages 3-5 ($p < .001$ for all three age groups). These tables also show racial/ethnic differences in the odds of such use, with African American children ($p < .001$) and Hispanic children ($p < .05$) both having 32% lower odds, and children of other race/ethnicities having 59% greater odds ($p < .01$), compared to whites. Finally, children who were in a program that used PCCM displayed half the odds of medication use ($p < .001$) compared to children in FFS Medicaid.

Part 2 of Table 2 displays predictors of expenditure among children with any (non-zero) expenditures on psychotropic drugs. Conditional on having any psychotropic medication use, children in the NSCAW study had \$374 greater expenditures ($p < 0.001$) than comparable children in Medicaid. Likewise, males had an average of \$218 more expenditures ($p < 0.05$), and older children in all three age categories had progressively greater expenditures ($p < .001$). Conditional on use, racial/ethnic differences persist in the level of expenditures. African American children had an average of \$292 less expenditures ($p < .05$) while children of other/unknown race/ethnicity had \$579 greater expenditure ($p < .01$) compared to white children. Interactions between NSCAW and the race/ethnicity variables are not significant (not shown). Finally, differences in expenditures by type of Medicaid insurance also parallel utilization, with children in a PCCM plan displaying \$880 less expenditures ($p < 0.001$) than children on FFS Medicaid.

Table 3 displays results from the same model conducted on a sample of NSCAW-only children. Among children with suspected maltreatment, many factors are still strongly significant in predicting differences in utilization. Within NSCAW, boys have more than twice the odds ($OR = 2.11$, $p < .001$) of females of using psychotropic medications, and odds ratios are very large (6-7 fold, $p < .001$) for children of older ages relative to those ages 3-5. A racial/ethnic disparity persists for African American children, who are 35% less likely ($OR = 0.65$, $p < .05$) than Whites to use psychotropic medications, although there are no differences for Hispanics or other/missing race/ethnicity. Those on PCCM insurance have 38% lower odds of medication use. Children in out of home placement ($p < .001$) and those with fair or poor health ($p < .01$) have more than twice the odds of using these medications. A very large difference in use is associated with a CBCL externalizing score of greater than or equal to 64 ($OR = 4.4$, $p < .001$), with a smaller increase for a similar score on the

internalizing scale ($OR = 1.4, p < 0.05$). Of the maltreatment history indicators, only physical abuse ($OR=1.4, p<.05$) was found to be associated with greater utilization.

The second and third columns in Table 3 provide information about expenditure differences, conditional on use of medications. Conditional on use, African American children with suspected maltreatment display \$614 lower expenditures ($p < .01$) than white children. PCCM insurance is associated with \$1,089 lower expenditures ($p < .001$), and children in other insurance types have \$1,325 greater expenditures on average ($p < .01$). Finally, a CBCL externalizing score of 64 or greater is associated with \$801 more expenditure ($p < .001$) conditional on receipt, as is a history of abandonment (\$809 more expenditure, $p < .05$).

DISCUSSION

In this study we examine, for the first time, racial/ethnic differences in Medicaid expenditures on psychotropic drugs among a national sample of children with suspected abuse and neglect coming to the attention of child protection agencies, linked to their Medicaid claims in 36 states. There are two sets of principal findings in this study. First, when compared to a matched sample of children without known child welfare contact living within the same zip codes, African-American children incur \$292 less expenditures on psychotropic drugs than white children. Second, after controlling for demographic factors, child need, and maltreatment history, there are expenditure disparities within our cohort of children coming into contact with child protection agencies. Medicaid spending on African-American children is \$614 lower than on white children, with reduced spending on some anticonvulsants and stimulants accounting for the bulk of expenditure differences.

Why do such racial/ethnic disparities exist? One set of explanations for racial/ethnic differences in medication use among high-risk children points to supply-side factors. The poor reimbursement rate of Medicaid which acts as a barrier to access to services (Cohen & Cunningham, 1995); the overall decreased access of African American children to specialty psychiatric care (Alegría et al., 2002); the lack of providers in low-income areas (where more African American children might reside) or within public sectors of mental health care (where more of these children might access services; Thomas & Holzer, 2006); neighborhood poverty (Chow, Jaffee, & Snowden, 2003); and the suppressive effect of Medicaid managed care (Raghavan et al., 2006) have all been advanced as ecological determinants of observed disparities. The first part of our study, which matched maltreated children to putatively non-maltreated Medicaid beneficiaries within zip codes, was designed to minimize such contextual influences upon expenditure differences by race/ethnicity. To the extent that maltreated children and non-maltreated children living within the same zip code experience similar challenges in accessing common health resources, share the same pool of Medicaid-assigned providers, experience similar Medicaid policy regimes and reimbursement rates, and share other unobserved characteristics at the level of a zip code, context should play a smaller role in explaining differences between these groups.

Despite these controls and even though overall spending on psychotropic medications for NSCAW children is \$374 more than spending on medications for comparison children –

consistent with studies showing greater disease burden among maltreated children (Burns et al., 2004) – spending on African American children is \$292 less when compared to their white peers. Prevalence of ADHD – as opposed to detection of ADHD – does not seem to vary between African American and white children, which could account for these disparities (Hudson, Miller, & Kirby, 2007). It seems clear, though, that African American children are not receiving behavioral interventions at a greater rate (which could be partial substitutes for medications), given the generally poor availability of behavioral or psychosocial treatments in pediatric practice (Wolraich et al., 1990). However, at least for ADHD, stimulant medications are a cornerstone of treatment (Dulcan, 1997), and so, assuming comparable burden of the disease among both race/ethnic subgroups, such expenditure disparities are a cause for concern. The magnitude of this expenditure difference is greater than that published previously using smaller Medicaid samples (Raghavan et al., 2012). We suggest, therefore, that contextual factors identified in earlier studies do not seem to explain the differences in expenditures seen among African American children with histories of suspected maltreatment.

It is possible, of course, that these findings are explained by differential need for mental health services between these two groups. The second part of our study, in which we use an exogenous indicator of mental health need, a clinical score on the CBCL, and then compare expenditure differences, is designed to arrive at expenditure disparities. Using this approach, African American children display disparities in Medicaid-funded psychotropic drug expenditures to the order of about \$614 when compared to white children. These models do not match African American and white children within a zip code, as in the prior case, but do use state and year indicator variables that control for unobserved effects within the Medicaid program that may explain these differences. Collectively, for this population, environmental explanations for disparities are, we submit, weak.

The other set of explanatory factors lies on the demand side, and it is likely that this is where the source of these differences in Medicaid expenditures lies. It is well known that treatment engagement and cultural mistrust, language barriers, and poor communication about medications all contribute to racial/ethnic disparities in psychotropic medication use (Atdjian & Vega, 2005).

It is also well known that the greatest differences between African American and white children are seen in rates of stimulant prescriptions (Zito et al., 1998), and there is evidence that misattribution of the causes of ADHD to a high-sugar diet, decreased receipt of disorder-specific information from providers, and variations in the sources of, and amount of, knowledge about ADHD is observed among African American families (Bussing, Schoenberg, & Perwien, 1998).

If this is the cause, then the solution is educational, requiring greater culturally competent patient education so that – for children who may benefit from them – access to ADHD medications is appropriately increased. There is little comparable literature on similar demand-side variations between African American and white children with respect to anticonvulsants, and consequently, explanations for our observed phenomena remain elusive. This research may or may not be sufficient for our special population, however.

Prior research has identified parents as key actors in reducing disparities in child mental health services (Zimmerman, 2005), an asset unavailable to many children receiving services while in the welfare system (McMillen, Fedoravicius, Rowe, Zima, & Ware, 2007).

On the other hand, there is also a robust body of work indicating possible overuse of medications among Medicaid-and SCHIP-eligible children (dosReis et al., 2005; Raghavan & McMillen, 2008). There are several controversies with respect to the diagnosis, treatment, provider undertaking the treatment, and societal implications of ADHD treatment, and although appropriateness of the use of these medications remains unclear, it is known that rates of medication use have increased in the United States in general (Mayes, Bagwell, & Erkulwater, 2008; J. Zito & Safer, 2005). Children with histories of maltreatment – especially of white race/ethnicity – are not immune to this trend and seem to be a population that exhibits simultaneous underutilization and overutilization of medications. Understanding the determinants of such patterns of use is critical to enhancing the appropriateness of psychopharmacological care for these children.

Our study is subject to a few limitations. Our expenditure results cannot be interpreted as national expenditure estimates – our data are essentially convenience samples of children drawn from 36 states. Second, we used Medicaid eligibility codes to identify a comparison sample of child Medicaid beneficiaries without foster care involvement. We do not have definitive information on maltreatment for these children, in which case our estimates of the magnitude of expenditure differences between NSCAW children and comparison children is conservatively biased. This means that it is likely that expenditure disparities in reality are greater than what we have reported. Third, in some states in our sample, such as California, increased managed care penetration and lack of availability of shadow claims precluded our ability to fully capture expenditures. Hence, our data are only reflective of children in non-managed Medicaid systems, which form the largest type of payment systems for children receiving services through the child welfare system (Raghavan & Leibowitz, 2007), and were the dominant plan types for child welfare children in our sample. Fourth, our data only reflect Medicaid expenditures generated by a paid claim; our results are not reflective of the true societal costs of psychotropic drugs among these children. Finally, our results on use and expenditure disparities cannot be used to answer questions about quality, or to infer appropriateness of the use of these medications.

Despite these limitations, this unprecedented merger of national survey data and claims data from 36 states reveals troubling levels of expenditure disparities among the most vulnerable of Medicaid's child beneficiaries – those who are victims of abuse and neglect. The fact that these children are all Medicaid insured means that expansion of insurance coverage will not overcome these disparities. If the reasons behind these expenditure differences are due to the demand-side factors noted above, then a supply-side intervention such as insurance coverage is unlikely to reduce these disparities. This is why increasing child Medicaid enrollment under the Affordable Care Act is not likely to reduce racial/ethnic disparities in Medicaid pharmacy expenditures. Instead, using the Medicaid expansions as a vehicle to better target caregivers of African American children, especially those for whom stimulants and anticonvulsants may be indicated, is necessary to reduce disparities in their care.

Acknowledgments

The National Survey of Child and Adolescent Well-Being (NSCAW) was developed under contract with the Administration on Children, Youth, and Families, US Department of Health and Human Services (ACYF/DHHS). The data have been provided by the National Data Archive on Child Abuse and Neglect.

This study was funded by the National Institute of Mental Health (R01 MH092312), the Agency for Healthcare Research and Quality (R01 HS020269), the National Institute of Mental Health, Office for Research in Disparities and Global Mental Health (HHSN271201200644P), and Grant Number T32MH019960 and 2T32 HL007456-26 from the National Institute of Mental Health.

Note. The information and opinions expressed herein reflect solely the position of the authors. Nothing herein should be construed to indicate the support or endorsement of its content by ACYF/DHHS, NIMH, or the National Institutes of Health.

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Table 1
Utilization rate and mean expenditures among children using each type of medication (nT = 9402 child-year observations)

Drug	White (nT=5014)		Black (nT=3056)		Hispanic (nT=777)		Other (nT=555)	
	Utilization (%)	Expenditure (\$)	Utilization (%)	Expenditure (\$)	Utilization (%)	Expenditure (\$)	Utilization (%)	Expenditure (\$)
MRX Classification								
Attention Deficit 05	0.128	615	0.127	513**	0.080***	586	0.171**	617
Depression/Anxiety 09	0.119	558	0.072***	457*	0.103	731*	0.103	844***
Psychotic Illness/Bipolar 40	0.067	1743	0.052**	1825	0.064	1999	0.086	1565
Seizure disorders 42	0.061	956	0.042***	841	0.055	1105	0.061	1427
Total for any of these	0.220	1456	0.175***	1298	0.171**	1822	0.240	1732
Red Book Classification								
Sedatives/hypnotics, Barbiturates 73	0.002	105	0.004	51*	0.009***	111	0.004	51*
Sedatives/hypnotics, Benzodiazepines 74	0.008	129	0.005	69	0.008	437	0.009	160
Anticholinergic/Antimuscarinic/Antispasmodic 26	0.009	43	0.009	73	0.014	77	0.108	126
Anticholinergic/Antiparkinsonian Agent 25	0.004	90	0.004	43*	0.003	24*	0.005	58
Anticholinergic, Not Elsewhere Classified 24	0.001	183	0.004*	265	0.002	38	0.009***	185
Anticonvulsants, Hydantoin Derivative 65	0.002	211	0.001	172	0.004	330	0.005	181
Anticonvulsants, Oxazolinediones								

Drug	White (nT=5014)		Black (nT=3056)		Hispanic (nT=777)		Other (nT=555)	
	Utilization (%)	Expenditure (\$)	Utilization (%)	Expenditure (\$)	Utilization (%)	Expenditure (\$)	Utilization (%)	Expenditure (\$)
66	0	-	0	-	0	-	0	-
Anticonvulsants, Succinimides 67	0	-	0	-	0	-	0	-
Anticonvulsants, Benzodiazepine	0.005	200	0.002*	29**	0.001	12***	0.004	73
Anticonvulsants, Miscellaneous	0.060	961	0.037***	928	0.051	1088	0.059	1437
Antimanic Agents, Not Elsewhere Classified	0.008	187	0.005	174	0.008	500	0.005	168
Anxiolytics/Sedatives/Hypnotics Not Elsewhere Classified	0.042	94	0.032*	44*	0.028	76	0.040	345
Central Nervous System Agents, Miscellaneous	0.014	437	0.007**	589	0.005*	613	0.007	461
Opiate Antagonists, Not Elsewhere Classified	0.001	1181	0	-	0	-	0	-
Antidepressants	0.112	554	0.068***	473	0.095	765	0.081*	911*
Antipsychotics	0.065	1780	0.051*	1845	0.066	1909	0.089*	1530
Stimulant, Amphetamine Type	0.124	587	0.125	492**	0.080***	546	0.169**	605
Stimulant, Non-Amphetamine	0	-	0	-	0	-	0	-
Total for any of these	0.250	1294	0.206***	1120	0.202**	1554	0.259	1622*

Notes: Mean expenditures shown reflect levels among users of the respective category (i.e., row means are conditional on positive expenditures in that row).

Table includes observations for both NSCAW children and propensity-score matched controls as shown in the model in Table 2.

* significant at <.05,

** significant at <.01,

Table 2

2-part regression model of cumulative drug expenditures (MRX classification), NSCAW versus comparison sample (nT = 9402 child observations)

	Part I: Odds Ratio (95% CI) for any expenditure	Part II: GLM Coefficients (95% CI) for expenditure if < \$0	Predictive Margin (Part II) for expenditure if < \$0 (\$)
NSCAW sample	1.93 (1.67, 2.24) ***	0.25 (0.12, 0.39) ***	374.47 (161.02, 587.91)
Male	1.90 (1.63, 2.22) ***	0.15 (0.01, 0.30) *	217.97 (−1.57, 437.51)
Age			
3-5	(omitted)	(omitted)	
6-11	9.03 (7.11, 11.47) ***	0.62 (0.33, 0.92) ***	914.96 (472.16, 1357.77)
12-13	12.19 (9.31, 15.97) ***	0.97 (0.66, 1.28) ***	1430.64 (947.02, 1914.25)
14 or older	13.89 (10.65, 18.12) ***	1.11 (0.81, 1.42) ***	1637.44 (1151.18, 2123.69)
Race/ethnicity			
White	(omitted)	(omitted)	
Black	0.68 (0.56, 0.82) ***	−0.20 (−0.38, −0.02) *	−292.25 (−557.73, −32.76)
Hispanic	0.68 (0.48, 0.95) *	−0.10 (−0.39, 0.19)	−144.14 (−572.11, 283.82)
Other/unknown	1.59 (1.15, 2.20) **	0.39 (0.11, 0.68) **	578.64 (150.58, 1006.70)
Insurance			
Fee-for-service (FFS) only	(omitted)	(omitted)	
Primary care case management (PCCM)	0.48 (0.39, 0.61) ***	−0.60 (−0.81, −0.39) ***	−880.11 (−1213.13, −547.09)
Other and multiple insurance types	1.17 (0.72, 1.91)	0.23 (−0.41, 0.87)	339.91 (−604.55, 1284.37)

Notes: All models include state and year dummy variables (not shown) to control for state Medicaid differences and time trends. All insurance categories in the model include full behavioral health coverage. Predictive margins reflect the mean effect for child observations with drug expenditures in any of the MRX categories in Table 1 (i.e., the marginal effect for Part II of the model).

* significant at <.05,

** significant at <.01,

*** significant at <.001

Table 3

2-part regression model of cumulative drug expenditures (MRX classification), NSCAW only (nT = 3520 child observations)

	Part I: Odds Ratio (95% CI) for any expenditure	Part II: GLM Coefficients (95% CI) for expenditure if > \$0	Predictive margin (Part 2)
Male	2.11 (1.62, 2.74) ***	0.20 (−0.01, 0.41)	327.93 (−12.13, 667.98)
Age			
3-5	(omitted)	(omitted)	
6-11	6.27 (4.04, 9.72) ***	0.19 (−0.26, 0.64)	307.09 (−423.09, 1037.27)
12-13	6.54 (3.95, 10.81) ***	0.36 (−0.13, 0.85)	587.97 (−202.05, 1377.99)
14 or older	6.88 (4.16, 11.36) ***	0.46 (−0.02, 0.95)	753.62 (−35.73, 1542.97)
Race/ethnicity			
White	(omitted)	(omitted)	
Black	0.65 (0.46, 0.92) *	−0.38 (−0.61, −0.15) **	−613.92 (−995.73, −232.11)
Hispanic	0.91 (0.58, 1.44)	−0.01 (−0.37, 0.36)	−9.10 (−598.84, 580.64)
Other/unknown	1.03 (0.59, 1.79)	−0.20 (−0.59, 0.18)	−328.47 (−956.48, 299.53)
Insurance			
Fee-for-service (FFS) only	(omitted)	(omitted)	
Primary care case management (PCCM)	0.62 (0.44, 0.89) **	−0.67 (−0.93, −0.41) ***	−1089.36 (−1546.64, −632.08)
Other and multiple insurance types	0.91 (0.45, 1.84)	0.82 (0.28, 1.35) **	1325.46 (436.57, 2214.36)
Out-of-home care vs. in-home	2.03 (1.51, 2.73) ***	0.04 (−0.17, 0.25)	71.03 (−267.99, 410.05)
Fair or poor health vs. excellent or good health	1.97 (1.32, 2.92) **	0.14 (−0.14, 0.42)	230.20 (−219.55, 679.95)
Rural vs. urban	1.08 (0.74, 1.57)	−0.03 (−0.28, 0.22)	−45.00 (−448.87, 358.88)

	Part I: Odds Ratio (95% CI) for any expenditure	Part II: GLM Coefficients (95% CI) for expenditure if > \$0	Predictive margin (Part 2)
CBCL Score			
Externalizing <i>t</i> score ≤ 64 vs. <i>t</i> score < 64	4.43 (3.31, 5.93) ***	0.50 (0.27, 0.72) ***	800.79 (420.24, 1181.33)
Internalizing <i>t</i> score ≤ 64 vs. <i>t</i> score < 64	1.38 (1.03, 1.86) *	0.17 (−0.04, 0.38)	275.97 (−70.99, 622.92)
Maltreatment history			
Physical abuse	1.41 (1.05, 1.89) *	−0.03 (−0.26, 0.20)	−44.45 (−419.23, 330.33)
Sexual abuse	1.30 (0.88, 1.90)	0.22 (−0.06, 0.51)	364.07 (−102.55, 830.69)
Neglect	0.81 (0.60, 1.10)	−0.01 (−0.25, 0.23)	−17.65 (−413.11, 377.82)
Abandonment	1.30 (0.78, 2.18)	0.50 (0.09, 0.90) *	808.56 (132.71, 1484.42)

* significant at <.05,

** significant at <.01,

*** significant at .001