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Medicaid Mental Health Organization and Second-Generation Antipsychotic Use Among Stimulant-Using Children

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Abstract

Objective—Reducing overuse of second-generation antipsychotics among Medicaid-enrolled children is a priority, yet little is known about how service organization may impact use. This study compares differences in second-generation antipsychotic utilization among Medicaid-enrolled children across three types of behavioral health organizational structures: fee-for-service, integrated managed care, and managed behavioral health carve-outs.

Methods—Organizational structures of Medicaid programs in 82 diverse counties in 35 states were categorized and linked to child-level cross-sectional claims data from the Medicaid Analytic Extract covering the 2004, 2006, and 2008 fiscal years. To approximate the population at risk for treatment, sample was restricted to stimulant-using children ages 3–18 with at least 10 months of enrollment (N=419,226). After stratifying by eligibility group, multivariable logistic regression models for probability of second-generation antipsychotic use were estimated. Models included

indicators of county-level organizational structure as main predictors, sequentially adjusting for individual and county-level covariates.

Results—In models adjusting for individual-level covariates, second-generation antipsychotic use was 31% higher among foster care youth in fee-for-service counties than carved-out counties (OR=1.69; CI=1.26–2.27). Foster care youth in integrated counties had the second highest adjusted odds (OR=1.31; CI=1.08–1.58). Similar patterns of second-generation antipsychotic use were also found for SSI youth, but not TANF youth. Differences persisted after further adjustment for county-level characteristics such as physician supply and socio-demographics.

Conclusion—Behavioral health carve-outs are associated with lower second-generation antipsychotic use compared to other arrangements. Future research should explore features of carve-outs (ex. tighter management of inpatient, restricted access, care coordination) leading to lower second-generation antipsychotic use.

INTRODUCTION

Second-generation antipsychotics substantially contribute to rising expenditures for Medicaid-enrolled children (1–4). Although primarily indicated for treatment of bipolar disorder and schizophrenia, most second-generation antipsychotic use among children is for off-label treatment of other mood and behavioral disorders (1,5). Second-generation antipsychotic use is controversial because efficacy has not been established for these off-label treatments and because there are side effects including metabolic disorders(6) and elevated risk of cardiovascular disease and diabetes (7–9).

While second-generation antipsychotic use has grown considerably across the United States in recent years, rates of increase and levels of use vary widely across states and regions(10,11). One possible influence on diverging utilization rates may be differences in the organization and delivery of Medicaid mental health services across localities. Some programs reimburse providers on a fee-for-service basis (i.e. based on a defined fee schedule). Others use managed care: either “integrated” plans, where a single plan receives a capitated payment to cover both physical and mental health benefits, or “carve-outs”, in which mental health benefits are paid for with separate capitated payments that cover services delivered by managed behavioral health organizations or local mental health authorities(12). Figure 1 provides a diagram of these three structures.

Our objective was to examine differences in second-generation antipsychotic use across different Medicaid organizational structures. We hypothesized that second-generation antipsychotic use would be lower under capitation than fee-for-service because theoretical and empirical research has found that capitated providers generally reduce the use of high-cost psychotropics (13,14). This can operate either indirectly through selective contracting by Medicaid programs with cost-conscious managed care organizations(15) or more directly through financial incentives for individual providers (13).

It is unclear, however, which type of capitated arrangement –integrated or carved-out – might have a larger impact on second-generation antipsychotic use. On the one hand, integrated programs may lower second-generation antipsychotic use through greater

coordination between primary care and specialty mental health providers, which could foster greater use of alternatives therapies or reduce the use of hospitalizations where antipsychotic use is often initiated (16,17). On the other hand, carved-out systems usually rely on only a single specialty managed behavioral health provider, which may possess greater case management and utilization review capabilities, as well as a less fragmented system in which to target interventions around medication management (18). Although more specialty service coordination might increase access to some services,(19) it could also reduce perceived overuse of treatments such as second-generation antipsychotics.

METHODS

Classifying Behavioral Health Organizational Structures

We conducted a comprehensive review of Medicaid policies in 82 counties in 34 states covering the period of 2004–2008. Counties were the unit of analysis because managed care arrangements are often established at the county level, and because there is county-level heterogeneity within states such as Texas. Our predominantly urban counties represent different Medicaid systems and provider environments (Table 1). Study counties were part of a prior national study of Medicaid-enrolled children (20). We began with 97 counties, but excluded 12 because they were not contained in our child-level Medicaid data, and also excluded three additional counties because of poor data quality for psychotropic prescriptions (defined as rates below 1% of all children within county). Inclusion of these three counties did not alter our main findings, however.

To measure Medicaid organizational structures, we reviewed policy documents from state Medicaid programs, managed care providers, and county agencies. We supplemented our review with government and research reports. Coding was conducted independently by two team members utilizing common criteria. Initial inter-coder agreement was attained in 66 cases (80%). Ambiguous cases were resolved with consultation with key informants (academic researchers and clinicians) in states where study counties resided. Study approval was granted by the University of Pennsylvania Institutional Review Board.

Of note, some counties with capitated structures allowed high-need populations to remain in fee-for-service arrangements during the study period. We defined the predominant organizational structures at the *county-level*, rather than the *child-level*, both because we did not have a comprehensive measure of which counties allowed select children to remain in fee-for-service in otherwise capitated counties, and because such children are likely not comparable to the general population of children in predominantly fee-for-service counties.

We also examined whether pharmacy benefits were capitated versus reimbursed as fee-for-service (defined independently of the behavioral health plan structure). Capitated arrangements included those where drugs were included in a per-member-per-month payment to a managed care organization or a third-party pharmacy benefits manager handled the pharmacy.

Medicaid Analytic Extract

We linked our county-level measures to cross-sectional, child-level data from the Medicaid Analytic Extract (MAX) covering the 2004, 2006, and 2008 fiscal years, during which use of second-generation antipsychotic use escalated among Medicaid-enrolled youth(10). The MAX is a national claims database. Demographic, eligibility, and pharmacy data were extracted from the personal summary and pharmacy files.

Our sample was restricted to children age 3–18 years with at least 10 months of enrollment. Among these children, we focused on those with any stimulant utilization in the year (N=419,226), a large population of children for whom the adjunctive use of antipsychotics is controversial(21). These youth comprised 3.8% of the total sample with 10 months enrollment. Many of these children are treated for disruptive behaviors related to a diagnosis of attention-deficit/hyperactivity disorder (22). Because diagnostic classifications in claims data are likely to be unreliable, the identification of stimulant using children allowed us to best approximate an at-risk population, and furthermore, selected for a group in whom the possibility of missing prescription data across counties was less likely (children with recorded stimulant use would be more likely to have complete utilization histories for other psychotropics given that we had identified their stimulant use).

Child-Level Covariates

We classified children into eligibility groups using a hierarchy: if the child had any enrollment in foster care they were defined as foster care, else they were categorized in the Supplemental Security Income (SSI) group if they had any SSI enrollment; remaining children were categorized in the Temporary Assistance for Needy Families/other (TANF) group. Foster care children and SSI account for many of the highest service-using children in the Medicaid program and TANF is the largest and most heterogeneous group.

Age was categorized within calendar years as 3 to 5 years, 6 to 11 years, and 12 to 18 years. Race/ethnicity was coded as white, black or African American, Latino, or other. Children with race classified as unknown were excluded from the analysis (6.8% of the stimulant-using child population). Five counties had >10% of the child population with race unknown; sensitivity analyses for these counties showed equivalent trajectories of psychotropic use over the study period.

Contextual Covariates

Using the Area Resource File, we selected county-level covariates representing contextual factors that could influence use of second-generation antipsychotics and mental health services more broadly, independent of county organizational structure. These include: the county supply of providers (pediatrician-to-population and psychiatrist-to-population ratios), (23,24) the urbanicity of the county (core urban, smaller urban, and suburban/rural),(25) and socio-demographics (the poverty rate and uninsured rate)(20). We also included the percentage of voters in the county voting for the Democratic candidate in the 2008 Presidential election, a proxy for public attitudes influencing social service regulation and provision(26,27).

Statistical Analysis

We first calculated the unadjusted rates of second-generation antipsychotic use across the organizational structures among sample children by eligibility group. In multivariable analysis, we used logistic regression models, stratified by eligibility group, to compare the odds of second-generation antipsychotic use across county-level organizational structures. Our first set of models adjusted for indicators for pharmacy structure, calendar year, and individual-level covariates. To assess whether these differences were attenuated by other features of county environment, our second set of models further adjusted for county-level contextual characteristics. A robust standard error estimator was used to accommodate clustering of children within counties. Using predicted margins, we calculated regression-adjusted probabilities of second-generation antipsychotic use within each eligibility group and organizational structure, setting the other covariates at the sample means. All analyses were conducted using Stata 12(28).

RESULTS

Covariate Differences by Organizational Structure

As shown in Table 1, a greater proportion of carved-out counties were located in large metropolitan areas, and a greater proportion of integrated counties were located in non-metro areas. A higher proportion of integrated counties had high poverty rates (57.1% compared to 30.4% of carved-out counties) and a higher proportion of integrated counties had elevated unemployment rates (47.6% versus 13.0% of carved-out counties). By contrast a higher proportion of carved-out counties had higher uninsured rates. A lower proportion of fee-for-service counties had a pharmacy that was capitated or integrated with behavioral health services, as opposed to being paid out separately.

Table 2 provides demographic characteristics of stimulant-using children in counties by organizational structure. Within fee-for-service counties, children in the TANF eligibility group comprised 60% of all sample children, compared to 53.3% of children in carved-out counties and 56.3% of children in integrated counties. At least half of all children in each organizational structure were in the 6–11 years old age group, with the largest percentage in fee-for-service counties (52.6%). Fee-for-service counties also had the largest percentage of children younger than 5 years old (5.1%). Carve-out and fee-for-service counties had similar racial/ethnic distributions, but integrated counties had more white and black children and substantially fewer Latino children (3.0% compared to about one-quarter in other counties).

Regression Estimates

Table 3 presents odds ratios for second-generation antipsychotic use by organizational structure separately for each eligibility group. Estimates in the left-hand panel adjust for child-level characteristics, year, and pharmacy structure.

Compared to children in carved-out counties, stimulant-using children in foster care in fee-for-service counties had the highest adjusted odds of second-generation antipsychotic use (OR=1.69; CI=1.26–2.27), and children in integrated counties had the second highest adjusted odds (OR=1.31; CI=1.08–1.58). Expressed as a predicted probability for a typical

child in foster care using a stimulant, one-third (33.6%) of children in foster care in carved-out counties would be predicted to use an second-generation antipsychotic, compared to 45.9% of such children in fee-for-service counties and 39.8% of children in foster care in integrated (Figure 2).

Among stimulant-using children in the SSI eligibility group, use of second-generation antipsychotics was again significantly higher in fee-for-service (OR=1.30; CI=1.10–1.55) and integrated counties (OR=1.19; CI=1.01–1.41) as compared to carved-out counties. The relative difference between fee-for-service and integrated was smaller among SSI children than for children in foster care. One third (33.3%) of SSI children in carved-out counties were predicted to use a second-generation antipsychotic (similar to foster care youth in those counties), as compared to 39.2% of SSI children in fee-for-service counties and 37.2% of SSI children in integrated counties. Finally, there were no statistically significant differences in second-generation antipsychotic use across organizational structures for stimulant-using children in the TANF eligibility group. Use of second-generation antipsychotics was lowest overall in this population, ranging from 15.0% in carved-out counties to 16.7% in integrated counties.

Further adjustment for county-level variables (Table 3, right-hand panel) generally did not alter relative differences in second-generation antipsychotic use between carved-out and fee-for-service counties. They did, however, substantially increase the relative differences between integrated and carved-out counties, and the predicted probabilities of using a second-generation antipsychotic in those counties. For example, adjustment for these variables increased the predicted probability of second-generation antipsychotic use for children in foster care from 39.8% to 45.3%. This was likely due to adjustment for county-level variables such as the poverty rate, which was associated with higher second-generation antipsychotic use on average (Figure 2).

DISCUSSION

We systematically compared use of second-generation antipsychotic medications among Medicaid-enrolled children in 82 counties, focusing on differences across three organizational structures (carve-outs, fee-for-service, and integrated). We found marked differences in second-generation antipsychotic use across organizational structures. For example, one-third of stimulant-using children in foster care in carved-out counties used second-generation antipsychotics, compared to almost half of such children in fee-for-service counties – a 31% relative difference. Second-generation antipsychotic use was relatively higher among children in foster care in integrated counties than in carved-out counties. Differences across organizational structures were smaller, but still significant, for children in the SSI eligibility group. These patterns persisted after adjustment for other socio-demographic and service system features of counties. Rates of use did not significantly vary across organizational structures for stimulant-using children in the TANF eligibility group, however.

Wider variation in second-generation antipsychotic use across policy structures among children in foster care, relative to other eligibility groups, likely reflects the fact that these

children are a particularly vulnerable population with high service use needs. In the absence of other institutional constraints, children in foster care may be targeted more often for second-generation antipsychotic treatment, with less oversight from a consenting guardian or parent (29). Children in foster care may also experience changes in placement, increasing disruptions in treatment and reducing oversight (30).

Our study findings contribute to an emerging literature on regional variation in mental health treatment. Small area differences in the intensity and cost of treatment have recently have been identified for psychotropic use among children (31). While contextual factors such as physician supply and poverty that predispose populations to receive more treatment are undoubtedly contributors(32,33), differences across systems persisted after adjusting for the factors we hypothesized could independently influence use of antipsychotics.

Our study underscores the need to focus on the prescribing behavior of clinicians, which in turn is likely to be influenced by incentives and constraints in different organizational structures. We hypothesized that second-generation antipsychotic use would be lower in both capitated systems than fee-for-service systems because capitated programs are more likely to contain costs by limiting access to high intensity services and managing a network of providers. Partially confirming this hypothesis, we found that use of second-generation antipsychotics was consistently higher among children in foster care and SSI populations in fee-for-service than in carved-out systems, but were not necessarily higher in fee-for-service than integrated systems.

Higher use of second-generation antipsychotics in fee-for-service counties relative to carved-out counties could stem from a less restrictive prescribing environment. Reducing the barriers to access to mental health treatments is considered to be one positive feature of fee-for-service systems, particularly in light of concerns that Medicaid-enrolled children with mental health problems often receive limited treatment and delay care (34). For instance, access to inpatient care is highly managed and may be more limited in carved-out settings (35). One unintended consequence of a less restrictive environment, however, could be broadened access to treatments such as second-generation antipsychotics, which are prone to overuse and may raise safety concerns. These competing objectives – reducing barriers to treatment and constraining prescribing of second-generation antipsychotics and similar medications – may require more complex reimbursement models and delivery structures. Hence, efforts to constrain use of second-generation antipsychotics should be evaluated within the broader context of efforts to increase contact with providers and increase use of non-medication treatments (including cognitive behavioral therapy), which could be particularly beneficial for children with emotional and behavioral problems.

It is less clear why use of second-generation antipsychotics among children in foster care and SSI populations might be higher in counties with integrated structures relative to carve-outs. We posited that some of this difference could be due to more aggressive management of inpatient and outpatient utilization and more coordinated programming of a range of therapeutic behavioral health services by specialized managed behavioral health organizations as compared to integrated organizations with less experience and expertise in contracting for mental health services.

Cost-management may reduce second-generation antipsychotic prescribing among primary care clinicians, but also buffer use of inpatient care and other settings where second-generation antipsychotic use is more prevalent. Relatedly, it is possible that a greater focus on provider credentialing and education could limit second-generation antipsychotic use, although it is unknown whether these efforts are greater within carved-out structures. Further investigating these differences in delivery and regulation of treatment is an important topic for future research.

Limitations

Several limitations should be considered in interpreting our findings. First, some service utilization may be under-reported in the MAX for managed behavioral health care enrollees (36). Reassuringly, recent studies find that patterns of prescription medication utilization in the MAX are consistent between managed care and fee-for-service (37). As noted, we also mitigate concerns about under-reporting by restricting our sample to children that already have a recorded stimulant prescription fill. Second, we do not adjust for diagnoses or clinical symptoms because of concerns of systematic bias in under-reporting across organizational structure. As such, we cannot assess patterns of service use within particular diagnostic groups or levels of clinical need.

Third, as mentioned, we focused on the predominant organizational structures in the county, but we could not systematically track cases where children in foster care or those in the SSI program may have been exempted from managed care. Because such children are sometimes allowed to remain in fee-for-service Medicaid in counties with managed care for other populations, our results for these groups may under-estimate differences between fee-for-service versus other structures. Finally, it is important to emphasize that while our cross-sectional study design can identify important associations, it cannot establish causality. There may be other unmeasured features of counties that simultaneously influence choice of organizational structure and prevalence of second-generation antipsychotic prescribing. Future research, employing pre-post comparisons, might enable better identification of causal mechanisms. Research might also examine the contribution of organizational structure to regional variation in antipsychotic use relative to other contextual variables.

Conclusions

The differences across organizational structures we identified in our study warrant further research, both to understand potential pathways through which organizational structures shape provider behavior and to identify the long-term impact on safety and quality of care.

Efforts to constrain overuse of second-generation antipsychotics among Medicaid-enrolled children will require some providers to change their prescribing patterns. Although carved-out Medicaid mental health benefits could reduce use of second-generation antipsychotics in children populations, a recent trend toward more integrated services should prompt closer investigation of other tools for tailoring second-generation antipsychotic use across a variety of settings. These tools include formulary restrictions, prior authorization, provider education (i.e. 'academic detailing'), and expanded access to alternatives to pharmacotherapy (including psychotherapy).

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1. Schematic of County Behavioral Health Organizational Structures

Notes: Integrated managed care: a county Medicaid program administers a single per-member-per-month payment to a managed care organization (MCO). The MCO contracts with individual providers. Carve-out: the Medicaid program administers separate PMPM payments to an MCO and a managed behavioral health organization (MBHO). By definition, plans and providers in integrated and carved-out counties received payment on a capitated basis. Fee-for-service: the county directly contracts with providers, or uses an administrative services organization (ASO) to manage providers, who are then paid on a FFS basis.

Figure 2.
 Predicted Probabilities for Second-Generation Antipsychotic Use Among Stimulant-Using Youth by Eligibility Group and County Organizational Structure
 [Note: black and white editable version is uploaded separately]

Table 1

Characteristics of Study Counties by Organizational Structure

	Carve-out	Fee-for-service	Integrated
Number of Counties	23	36	21
County Characteristics (% of column)			
Capitated/integrated pharmacy	35%	28% *	38%
Large Metro	57%	42%	43%
Small Metro	35%	39%	29%
Non Metro	9%	19%	29%
High Pediatrician Rate (>20 per 100K)	35%	39%	33%
High Psychiatrist Rate (>15 per 100K)	26%	31%	29%
High Poverty Rate (>15%)	30%	47% *	57% *
High Unemployment (>7%)	13%	19% *	48%
High Uninsured (>18%)	57%	39% *	19% ***
Majority voted Democrat	52%	42% *	48%

Note: Authors' analysis of data from the Area Resource File years 2002–2008. Columns represent the average within each category across years. Data reflect closest calendar year (for those measures such as physician supply that are not reported annually). Pairwise *t*-test from carve-out,

* $P < .05$,

** $P < .001$,

*** $P < .0001$.

Table 2

Characteristics of Stimulant-Using Children in Our Sample by Organizational Structure

	Carve-out	Fee-for-service	Integrated
N	152,750	172,124	94,352
Eligibility category (% of column)			
Foster care	28.3	15.0 ***	21.0
SSI	18.4	24.9 *	22.7
TANF	53.3	60.0	56.3
Sex			
Male	74.0	71.9	72.7
Age group (% of column)			
3–5 years	3.3	5.1 ***	2.8 *
6–11 years	50.3	52.6	50.3
12–18 years	46.4	42.3	46.9
Race/ethnicity (% of column)			
White	42.1	41.6	52.0
Black	31.2	34.1	43.4
Latino	25.0	23.4	3.0 ***
Other	1.8	0.9 *	1.6

SOURCE: Authors' analysis of the Medicaid Analytic Extract. Study sample is comprised of youth age 3–18 with any stimulant prescription and 10 months of Medicaid enrollment in one of the study counties. Pairwise *t*-test from carve-out,

* $P < .05$,

** $P < .001$,

*** $P < .0001$.

Odds Ratios for Second-Generation Antipsychotic Use Among Stimulant-Using Youth by Eligibility Group and County Organizational Structure

Table 3

	Adjusted for Child-Level Variables			Adjusted for Child and County Variables		
	Odds Ratio	95% Confidence Interval	P-Value	Odds Ratio	95% Confidence Interval	P-Value
Foster Care						
Carve-out	Ref			Ref		
Fee-for-Service	1.69	1.26–2.27	<.001	1.55	1.28–1.88	<.001
Integrated	1.31	1.08–1.58	.006	1.71	1.28–2.27	.000
SSI						
Carve-out	Ref			Ref		
Fee-for-Service	1.30	1.10–1.55	.003	1.30	1.09–1.54	.003
Integrated	1.19	1.01–1.41	.036	1.51	1.15–1.97	.003
TANF						
Carve-out	Ref			Ref		
Fee-for-Service	1.10	.86–1.41	.43	1.13	.90–1.40	.30
Integrated	1.14	.86–1.51	.37	1.45	1.05–2.01	.024

Note: Child-level regression models adjust for age, race/ethnicity, sex, year, and pharmacy structure, county-level models further adjust for provider supply, metro status, county poverty, uninsured rate, and unemployment, and county vote share in 2008 election. Study sample is comprised of youth age 3–18 with any stimulant prescription and 10 months of Medicaid enrollment in one of the study counties."