

Treatment Use and Costs Among Privately Insured Youths With Diagnoses of Bipolar Disorder

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Objective: Recent evidence suggests that children are increasingly diagnosed as having bipolar disorder, yet no studies have quantified treatment costs for pediatric patients. The objectives of the study were to identify one-year health services utilization and treatment costs among youths newly diagnosed as having bipolar disorder. **Methods:** MarketScan administrative claims from 2005 to 2007 were used to construct a retrospective person-level cohort of children ages zero to 17 to identify one-year health services utilization and costs among privately insured youths with a bipolar diagnosis. Inpatient and outpatient services were categorized as mental health related or non-mental health related. Pharmacy costs were classified as psychotropic or nonpsychotropic. **Results:** In the sample (4,973 youths), one-year mean reimbursements for health services were \$10,372, and patient out-of-pocket spending was \$1,429 per child. Mental health services accounted for 71% of all health care spending, with psychotropic medications and inpatient care contributing the largest proportions of total spending (24% and 27%, respectively). **Conclusions:** The costs of care among privately insured children with bipolar disorder are similar to those of adults. However, spending on children is concentrated on mental health-related services. Because private insurance plans have historically limited mental health service benefits, the concentration of spending on mental health services may place a greater burden on families for out-of-pocket payments. As mental health parity is adopted by private insurers, monitoring its impact on patient utilization and costs of health services will be important, particularly for children with serious mental illness. (*Psychiatric Services* 63: 1019–1025, 2012; doi: 10.1176/appi.ps.201100516)

Bipolar disorder is a chronic affective disorder that results in substantial impairments.

According to the World Health Organization, bipolar disorder is ranked sixth among all medical disorders in years

of lost life due to death or disability (1), and it has been consistently rated among the top causes of disability-adjusted life years for 15- to 44-year-olds in developed countries (2). Individuals with bipolar disorder generally experience a chronic, recurrent course of illness that increases their risk of lifelong disability and greatly affects their lives and the lives of their families (3).

Once considered rare among children, bipolar disorder diagnoses have increased sharply in this population in both inpatient and outpatient settings, according to recent studies (4–8). Children with bipolar disorder have significantly higher rates of morbidity and mortality than children without the disorder (9), including psychosocial morbidity, impaired academic performance, impaired social and familial support, increased levels of substance abuse, weight problems, legal difficulties, and hospitalizations (10–14). Although the criteria for diagnosing and the use of the bipolar diagnostic label among children with nonclassical symptom presentations are matters of clinical debate (14,15), a growing number of children over recent years have received these diagnoses and related treatment.

In addition to the enormous personal and familial burden, the economic impact of bipolar disorder is extremely high, particularly after accounting for the opportunity costs of

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living with a mental illness (16). In fact, a 2003 study found that bipolar disorder was the most expensive behavioral health diagnosis for both patients and their insurance plans (17). With the knowledge that over 90% of patients with bipolar disorder suffer recurrences and many experience progressive deterioration in functioning (18), it is important to consider the financial impact of this disease from both the family and the health plan's perspective.

The costs related to treating children with bipolar spectrum disorders are likely to differ from those for treating adults. No cost-related study of bipolar disorder (19–25) has focused on children. In addition, only two studies have used data from 2003 or later (19,25). This dearth is a critical limitation for several reasons. First, during the past decade, there has been a dramatic increase in the diagnostic prevalence of bipolar disorder among children. Second, the number of psychotherapeutic treatment options (including second-generation antipsychotics and anticonvulsants) has grown. Finally, inpatient lengths of stay among patients with mental illness, including children, have also decreased (7), suggesting that costs for bipolar treatment may have shifted from inpatient to outpatient care.

Research has found that families with private health insurance are more likely to be underinsured and to report inadequate coverage of needed services, especially families of children with special health care needs (26). Given that private health insurance remains the dominant payer for children's mental health and hospital services (27), estimating service use and costs of treatment for privately insured youths with bipolar disorder will help to quantify the impact of this disorder on children, their families, and the health care system. The objectives of this study were to identify utilization patterns and estimate health plan payments for inpatient, outpatient, and pharmacy services among privately insured children with bipolar disorder diagnoses.

Methods

This project received an exemption from the institutional review board at

the University of North Carolina at Chapel Hill.

Data source

A longitudinal retrospective person-level cohort study was conducted with data from the Thomson Reuters MarketScan database. These data include deidentified clinical utilization and expenditures information for inpatient, outpatient, and pharmacy services for approximately 35 million Americans insured by some 100 payers.

Sample selection

Children (ages 17 years and younger) were included if they had one inpatient or at least two outpatient insurance claims for a bipolar spectrum disorder (on separate service dates) from January 1, 2005, through December 31, 2007. *DSM-IV* codes were mapped to the respective *ICD-9-CM* codes to identify claims for a bipolar spectrum disorder (*ICD-9-CM* codes 296.0, 296.1, 296.4–296.6, or 301.13) (28–30).

To assess prior diagnoses and to allow for continuous follow-up, the study criteria required children to have at least one of their bipolar diagnoses between July 1, 2005, and December 31, 2006 (hereafter called the index diagnosis date). Children with incident and prevalent diagnoses who were continuously enrolled for 180 days before and 365 days after their index diagnosis date were included ($N=7,119$). From this sample, children with conditions that mimic symptoms of mania (multiple sclerosis, hyperthyroidism, closed or open head injury, and lupus), require a bipolar-related treatment (epilepsy), or complicate bipolar disorder treatment (pregnancy) (11,31) were excluded from the analysis, as were children with schizophrenia, pervasive developmental disorders, mental retardation, or substance use disorders in the 180 days before their index bipolar diagnosis ($N=1,011$) (32). Finally, children whose insurance plans did not provide information on medication use were excluded from the analysis to differentiate between nonuse and nonreporting of medications ($N=1,135$). The final sample included 4,973 children.

Study variables

Inpatient and outpatient service utilization and cost classification. Using inpatient and outpatient service claims associated with the primary *ICD-9* code, we classified each claim as being related to mental health conditions, including bipolar disorder (*ICD-9* codes 290.00–319.99), or to non-mental health conditions (all other *ICD-9* codes). To avoid overestimating the number of visits children in the cohort made, we excluded duplicate claims on the same service date and outpatient visits during which only laboratory services were provided (Current Procedural Terminology codes 80048 through 89356). However, charges for all services received, including laboratory claims, were included in cost estimates. Children's mean out-of-pocket costs and mean total health costs were estimated. Out-of-pocket patient costs were calculated as the sum of copayments, coinsurance, and deductible payments. Total health costs included both out-of-pocket patient costs and health plan costs (negotiated fees paid to providers for services).

Prescription drug utilization and cost classification. Prescription drug use was classified as psychotropic or nonpsychotropic medication use. Psychotropic medications, identified with the American Hospital Formulary Service Classifications, included lithium, anticonvulsants, antipsychotics, antidepressants, stimulants, anxiolytics, sedatives, hypnotics, and other psychotropic agents (including antiparkinsonism agents and two alpha-agonists prescribed for ADHD: clonidine and guanfacine). All other drugs were categorized as nonpsychotropic medications.

Statistical analysis

The number and proportion of patients who utilized services are presented, both overall and by the type of services used (inpatient, outpatient, and pharmacy for mental health and non-mental health reasons). Mean costs of health services among all children in the cohort (users and nonusers of services) are presented separately by type of service. All costs were inflation adjusted to 2007 dollars with the medical component of the consumer price index.

Results

Sample characteristics

Characteristics of children included in the sample are provided in Table 1. Among the 4,973 children who met eligibility criteria, approximately 29% were under 13 years of age at their index diagnosis, date, and just under half were female. Thirty-four percent of patients had inpatient mental health visits over the study period. Attention-deficit hyperactivity disorder (ADHD) was the most commonly diagnosed condition in the 180 days prior to the patients' index bipolar diagnosis and was diagnosed for 25% of the children in the sample.

Utilization of health care

Annual utilization of inpatient, outpatient, emergency, and pharmacy services is summarized in Table 2. Overall, 31% of children received inpatient services in the year after their index bipolar diagnosis. Of those receiving inpatient services, 93% (1,455 of 1,564) received services for a mental health–related condition, and approximately 11% (174 of 1,564) received non–mental health services.

Children in the sample averaged 19.6 outpatient visits over the course of one year, with 14.1 mental health–related visits per patient. Approximately 6% of the children in our sample had visits to an emergency department. The most common reasons for emergency visits were for mental health–related conditions (including depressive psychosis, other mood disturbances, and ADHD).

Finally, 93% of children received medications, with 87% receiving psychotropic medications and 74% receiving nonpsychotropic medications.

Costs of health care

Average annual costs of inpatient, outpatient, and pharmacy services are summarized in Table 3. Over the course of one year of the index diagnosis, mean total health care costs were \$10,372 and family out-of-pocket costs for all services were \$1,429. Total costs for all mental health services were \$7,356, making up over 71% of all health care spending. The largest portion of

Table 1

Characteristics of 4,973 children with diagnosed bipolar disorder

Characteristic	N	%
Age (M±SD years)	13.5±3.1	
0–6	193	3.9
7–12	1,248	25.1
13–17	3,532	71.0
Female	2,393	48.1
Bipolar disorder subtype		
Type I	1,743	35.0
Type II	632	12.7
Not otherwise specified	2,466	49.6
Cyclothymia	132	2.6
Disease severity		
Comorbid mental health condition (M±SD) ^a	1.5±1.3	
Any inpatient mental health visit	1,705	34.3
Prior mental health diagnosis ^a		
Attention-deficit hyperactivity disorder	1,249	25.1
Oppositional defiant disorder	313	6.3
Conduct disorder	299	6.0
Dysthymic disorder	248	5.0
Anxiety disorder	222	4.5
Other mood disorder	548	11.0
Substance use disorder	113	2.3
Received care for bipolar disorder from a psychiatrist ^a		
Yes	2,799	56.3
No	2,174	43.7

^a Identified from paid inpatient or outpatient claims from the six-month preindex diagnosis period. The occurrence of inpatient mental health visits was measured during the 18-month study period.

health care expenditures was for inpatient mental health visits (26.5%), outpatient mental health visits (20.2%) and psychotropic medications (24.3%) (Figure 1).

The mean total cost of pharmacy services for both psychotropic and nonpsychotropic medications was \$2,903 per patient, with psychotropic medications accounting for 87% of total prescription drug spending.

Discussion

Although there has been increasing attention paid to pediatric bipolar disorder over the past decade, little is known about treatment utilization patterns and costs in this growing population. In this sample the mean one-year total health care costs among children were found to be remarkably similar to published cost estimates for adults with bipolar disorder (19–25,33). Outpatient costs made up 38% of total costs, inpatient costs made up 35%, and medication costs 28%, which are similar to estimates for adults (20). However, mental health–related spending represented 71% of total spending in this sample. This finding

is in contrast to estimates in adult samples (21) that have found spending on mental health care to represent only 22% of health care spending.

When considering the differences between adults and children in the proportion spent on mental health care compared with total health care, it is important to note that cost estimates also include care for chronic medical conditions, which are more prevalent among adults than among children. As such, a higher concentration of spending on mental health services was anticipated for children compared with adults. However, lower total costs of care (mental health and non–mental health care combined) were also anticipated for children, given the expectation of higher non–mental health spending among adults. Instead, total costs were similar when comparing estimates for adults and children because of higher spending on mental health treatment among children. This may be due to difficulties in accurately diagnosing bipolar disorder among children (that is, diagnostic uncertainty) and the high rates of comorbid mental health

Table 2

Service utilization by children within one year of bipolar disorder diagnosis, overall and by service type

Service	Any visits		Mental health visits		Non-mental health visits	
	N	%	N	%	N	%
Inpatient	1,564	31.4	1,455	29.3	174	3.5
Outpatient	4,963	99.8	4,963	100.0	4,581	92.3
Outpatient visits per patient						
Mean \pm SD	19.6 \pm 16.3		14.1 \pm 13.9		5.4 \pm 7.3	
Median (interquartile range)	15 (18)		10 (16)		3 (6)	
Emergency	302	6.0	283	5.7	266	5.3
Pharmacy ^a	4,631	93.1	4,342	87.3	3,690	74.2

^a Pharmacy services for mental health include the following psychotropic medications: lithium; anticonvulsants; antipsychotics; antidepressants; stimulants; anxiolytics, sedatives, and hypnotics; and other psychotropic agents (including antiparkinsonism agents and two alpha-agonists prescribed for attention-deficit hyperactivity disorder: clonidine and guanfacine).

conditions that accompany pediatric bipolar disorder.

For non-mental health care, outpatient care was the highest cost category. This was due primarily to high levels of utilization of services, rather than high costs of services in this category. Closer evaluation of the study sample showed that nearly 56% of non-mental health outpatient visits had total costs of less than \$100, and nearly 91% had total costs of less than \$500. The most common diagnosis coded for non-mental health visits was for routine infant or child health check-ups. Other common reasons for visits were acute sinusitis, acute

pharyngitis, respiratory infections, allergies, asthma, abdominal pain, and fatigue or malaise.

Understanding the financial burden of pediatric bipolar disorder treatment is important because previous studies found that even among families with private insurance coverage, families with children with special health care needs (including mental health) have significantly greater financial barriers than families with children without these conditions (34,35). Research suggests that up to 25% of continuously insured families with private health insurance are underinsured, as defined by the family's perspective on

the reasonableness of out-of-pocket expenses (26). In the study sample, families paid on average \$1,429 out of pocket during one year of a child's bipolar disorder. These payments represent the reported patient out-of-pocket expenses (copayments, coinsurance, and deductibles) but do not include premiums paid by the patient. In addition, these estimates do not consider indirect costs, such as lost productivity or absenteeism from work or school (for family members or the patient), child care, or other time and services for managing the child's bipolar disorder. Given the chronic, recurrent nature of bipolar disorder, these costs may be substantial.

Private insurance plans have historically limited mental health service benefits more aggressively than general medical benefits. In this sample there was some evidence of higher cost sharing for mental health care than for general medical care. For example, when looking at the total costs of outpatient mental health services, we found that 54% of total costs for outpatient services were mental health related, yet these visits accounted for 60% of the patient's out-of-pocket costs. Similarly, 77% of inpatient costs were mental health related, but these accounted for 92% of patient out-of-pocket inpatient costs. Not surprisingly, this relationship was not found with psychotropic medication cost sharing because medications are generally managed separately from mental health benefits.

Recently there have been important changes in the legislation for determining mental health benefits. With

Table 3Costs for services among privately insured children with bipolar disorder, overall and by service type^a

Costs	All services		Mental health		Non-mental health	
	M	SD	M	SD	M	SD
Patient ^b						
Inpatient services	\$307	\$1,504	\$282	\$1,453	\$25	\$245
Outpatient services	\$664	\$906	\$401	\$697	\$263	\$519
Pharmacy services	\$458	\$504	\$373	\$450	\$85	\$161
Total	\$1,429	\$2,914	\$1,056	\$2,600	\$373	\$925
Total ^c						
Inpatient services	\$3,574	\$16,888	\$2,746	\$8,137	\$828	\$14,548
Outpatient services	\$3,895	\$6,442	\$2,092	\$4,482	\$1,803	\$4,077
Pharmacy services ^d	\$2,903	\$3,426	\$2,518	\$2,836	\$385	\$1,676
Total	\$10,372	\$2,976	\$7,356	\$15,455	\$3,016	\$20,301

^a All dollars were inflation adjusted to 2007 dollars with the medical consumer price index.

^b These costs represent the total that the patient paid in copayments, coinsurance, and deductible payments. Patient costs do not include premiums paid for insurance benefits.

^c These costs represent payments made for services after applying pricing guidelines (fee schedules and discounts) but before applying deductibles, copayments, and coinsurance.

^d Pharmacy services for mental health include the following psychotropic medications: lithium; anticonvulsants; antipsychotics; antidepressants; stimulants; anxiolytics, sedatives, and hypnotics; and other psychotropic agents (including antiparkinsonism agents and two alpha-agonists prescribed for attention-deficit hyperactivity disorder: clonidine and guanfacine).

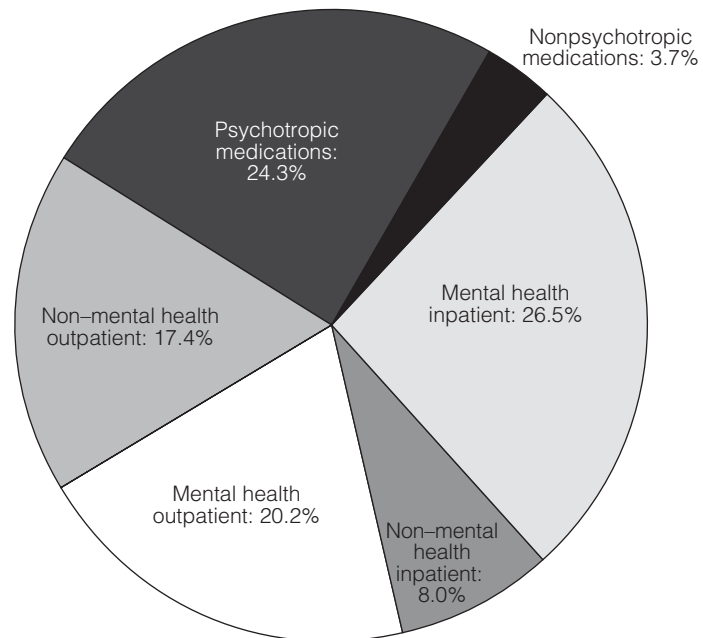
the signing of the Paul Wellstone and Pete Domenici Mental Health Parity and Addiction Equity Act in October of 2008 (P.L. 110-343), and more recently the Patient Protection and Affordable Care Act, employer-sponsored health plans are now required to cover mental health and substance abuse services at the same level as medical-surgical benefits. These policy changes may help to reduce the discrepancies between the mental health and non-mental health cost-sharing burden as described earlier. However, insurers are able to opt out of offering mental health and substance abuse treatment, or they may elect to cover only specific disorders (36). Given the high proportion of spending on mental health services among privately insured children with bipolar disorders, monitoring health plan coverage for bipolar disorder and the impact of benefit changes on children's health services utilization is important.

Although no previous studies have estimated total costs of treating bipolar disorder, our inpatient cost and utilization estimates are consistent with a recent study focused on estimating the inpatient burden of pediatric bipolar disorder. In that study, average costs of inpatient treatment were slightly higher but similar to our results, and differences between estimates were likely due to higher costs and longer inpatient stays among youths on Medicaid in the former study (37).

Data directly comparing health care costs for our bipolar sample and similarly aged children, or even subgroups of patients with other chronic conditions, are not readily available. One example of comparison data for a similar population comes from a study of children with diabetes. That study assessed the total average annual costs of diabetes treatment in 2007 with the MarketScan insurance claims data and found that youths with diabetes had \$9,061 average annual total expenditures, whereas youths without diabetes had expenditures of only \$1,468 (38). In contrast to these estimates, average annual total costs for youths with bipolar disorder in this study were \$10,372 (in 2007 dollars), with much of this cost attributed to

Figure 1

Proportion of one-year total health care costs for 4,973 children with bipolar disorder, by source of expenditure



mental health-related spending. Costs for non-mental health treatments among children with bipolar disorder in our sample were also higher than costs estimated for children without diabetes. Reasons for this may include more frequent health care utilization or possibly increased physical comorbidities associated with treating bipolar disorder (such as metabolic conditions that developed subsequent to usage of second-generation antipsychotics).

There are several limitations that are important to consider when interpreting the results of this study. First, administrative claims rely on diagnosis codes, rather than on structured evaluations, to identify patients with bipolar disorder, which may have resulted in disease misclassification. In an attempt to minimize bias from misclassification, we restricted the sample by including only children with more than one bipolar diagnosis or an inpatient stay, which has been shown to increase the specificity of the diagnosis (39). Related to this caveat, a large proportion (50%) of our sample received a diagnosis of bipolar disorder not otherwise specified (bipolar NOS). This diagnosis may represent diagnostic uncertainty

on the part of the clinician. It is unclear whether children with these diagnoses would convert to a bipolar type I or bipolar type II diagnosis, but evidence suggests that conversion from bipolar NOS to a more specific diagnosis occurs frequently among youths (40). It is important to bear in mind that inclusion of children with less severe behavioral diagnoses would likely result in conservative estimates of treatment costs and utilization for the sample.

Second, it is unclear whether diagnoses made in childhood persist as the child ages into adulthood, although some suggest that bipolar I and bipolar II designations may be continuous from childhood to adulthood (41). These factors may affect the long-term costs of treatment but would not affect the short-term estimates provided in this study. Third, total costs are based on actual payments received by physicians from both the health plan and the patient. These costs are based on negotiated prices between the health plan and the provider and may not be generalizable to publicly insured or to uninsured populations. Finally, cost estimates generated for patient out-of-pocket payments must be

interpreted with caution because details on the cost-sharing arrangements between health plans and patients (such as the plan premium) were not available for this analysis.

Conclusions

The costs of care among privately insured children with bipolar disorder are similar to those of adults. However, spending on children is concentrated on mental health–related services. This is important given that private insurance plans have historically limited mental health service benefits, which may place a greater burden on families for out-of-pocket payments. As mental health parity is adopted by private insurers, it will be important to monitor the impact on patient utilization and costs of health services, particularly for children with serious mental illness.

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