

# One-Year Treatment Utilization Among Adolescents With Bipolar Spectrum Disorder

Tina R. Goldstein, Ph.D., Melissa Saul, M.S., Dylan Nagy, M.S., Raeanne Sylvester, M.S.W., Noelle Rode, B.S., Julie Donohue, Ph.D.

**Objective:** Early-onset bipolar disorder is among the costliest psychiatric disorders; yet inpatient and outpatient service use patterns in this group are largely unknown. One-year behavioral and medical health service use was examined among adolescents diagnosed as having bipolar disorder, and rates were compared between adolescents with threshold versus subthreshold bipolar disorder.

**Methods:** Participants included 100 adolescents (ages 12–18 years, 85% had been assigned female sex at birth) diagnosed as having bipolar disorder (type I, N=14; type II, N=28; not otherwise specified [NOS], N=58) via semi-structured interviews and who consented to electronic health record (EHR) data review for enrollment in a psychosocial treatment study. Service use data were extracted in the year preceding study entry from a data repository containing all clinical and financial records (including outpatient and inpatient behavioral and medical visits) from a large western Pennsylvania health system.

**Results:** EHRs indicated that 99% of adolescents used some behavioral health service, most commonly outpatient psychotherapy (60%) and medication management (43%). Use of intensive behavioral health services was common (49%), and 48% had at least one psychotropic medication noted in their EHR. General medical health services were used by 78%, most commonly outpatient (67%) and emergency department (39%) visits. No differences in service use were observed for adolescents with bipolar disorder type I or II compared with NOS for any services or medications examined.

**Conclusions:** High use of behavioral and medical health services among adolescents with bipolar spectrum disorders has important implications for health care systems, insurers, providers, and consumers. Greater coordination of health care for this high-risk, high-use population may improve outcomes.

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Bipolar disorder is characterized by discrete episodes of elated-irritable mood (hypomania) and low mood (depression) that profoundly affect psychosocial functioning (1). The mental health field has increasingly recognized the substantial public health burden of bipolar disorder onset during childhood (2). More than 50% of individuals who develop bipolar disorder have had illness onset during childhood or adolescence (3). Of note, those with early-onset bipolar disorder display greater rates of co-occurring psychiatric (e.g., anxiety and substance use disorders) and medical (e.g., asthma and migraine) conditions (4–6), as well as greater risk for suicide, than those who experienced bipolar disorder onset in adulthood.

It is therefore not surprising that compared with youths with other psychiatric disorders, youths with bipolar disorder are among the highest users of behavioral health services. In fact, early-onset bipolar disorder is among the costliest psychiatric disorders (7–9). Annual health care service use and expenditures for adolescents with bipolar disorder exceed those for adolescents with all other

psychiatric disorders (10). Most previous studies among youths with bipolar disorder have focused on exorbitant health care costs primarily driven by high use of inpatient

## HIGHLIGHTS

- Adolescents diagnosed as having bipolar disorder not otherwise specified used behavioral and medical health services at rates similar to those with bipolar disorder type I or type II.
- Outpatient psychotherapy and medication management were the most commonly used behavioral health services over 1 year.
- Intensive behavioral health services were used by nearly half of the sample and included psychiatric inpatient, emergency department (ED), and partial services as well as intensive outpatient programs.
- Medical health service use primarily included outpatient and ED visits.

psychiatric care, emergency services, and medical admissions for suicidal behavior (10, 11). High rates of psychotropic polypharmacy (12, 13) and management of resultant adverse effects on general health (e.g., obesity) further drive costs for this population. These data translate into threefold greater annual behavioral health care costs, and twofold greater annual medical health care costs, to treat an adolescent with bipolar disorder compared with an adolescent with a nonbipolar mood disorder.

Although these previous studies have documented high behavioral health service use and associated costs in this high-risk population, they have three important limitations. First, previous studies have largely relied on administrative claims data to identify youths with bipolar disorder. Given that accurate differential diagnosis of bipolar disorder among youths is complex, both over- and underdiagnosis are common in the absence of evidence-based assessment strategies (14, 15). Thus, claims data alone have questionable diagnostic reliability (16). Second, previous studies have not distinguished among bipolar disorder subtypes. Debate surrounding the validity and clinical relevance of bipolar spectrum diagnoses that do not meet full *DSM* criteria (1, 17), that is, bipolar disorder not otherwise specified (NOS) and bipolar disorder other specified, further reduce the reliability of claims data because diagnostic criteria for bipolar spectrum disorders have historically been lacking (18). Operationalized bipolar disorder NOS criteria were developed for the Course and Outcome of Bipolar Youth (COBY) study (19). Similar comorbidity and severity, as well as high rates of conversion to threshold bipolar disorder (i.e., type I or II) during follow-up, have been reported for youths with bipolar disorder NOS (20, 21). Although *DSM* criteria for bipolar disorder type I include hospitalization for mania, and although some previous studies have reported higher rates of psychiatric hospitalization among youths with bipolar disorder type I compared with NOS (19), little is known about relative rates of hospitalization, or treatment use more broadly, among bipolar subtypes among youths (20). Third, previous studies of the service use of youths with bipolar disorder have failed to examine different levels of intensive care (e.g., partial hospitalization and in-home services).

In this analysis, we addressed these weaknesses by linking administrative data to reliable and valid semistructured diagnostic interview data collected after patients entered a randomized psychosocial treatment study. Using electronic health record (EHR) data, we compared differences in behavioral and medical service use between adolescents diagnosed as having threshold bipolar disorder (i.e., type I or II) and bipolar disorder NOS over a 1-year period before study entry. Estimates of both behavioral and medical health service utilization were expected to be high in the sample, with similar rates of behavioral and medical service use across bipolar subtypes.

## METHODS

### Participants

Participants included 100 adolescents (ages 12–18 years) diagnosed as having bipolar spectrum disorder who participated in at least one study treatment session within a psychosocial treatment study (ClinicalTrials.gov: NCT02003690) from November 2014 to September 2019 conducted at the University of Pittsburgh (all service use data preceded the COVID-19 pandemic). The University of Pittsburgh Institutional Review Board approved all study procedures in accord with the Declaration of Helsinki.

Study staff explained all procedures to interested adolescents and parents, who provided written informed consent or assent for study procedures. Recruitment sources included a psychiatric specialty clinic for pediatric bipolar disorders (N=53; the majority was approached at clinic intake), community mental health providers (N=40), and advertisements or other (N=7). Eligible adolescents were engaged in, or willing to proceed with, a pharmacotherapy regimen and had a parent or guardian willing to participate in family sessions; use of any behavioral or medical health services was not required for eligibility. Those with pervasive developmental disorder were excluded, but no other exclusions based on comorbid behavioral or medical health conditions were imposed.

### Psychiatric Diagnosis

After participants had provided consent or assent, a masters-level clinician conducted a rigorous diagnostic assessment that included standardized measures. Clinicians administered the semistructured Kiddie Schedule for Affective Disorders and Schizophrenia–Present and Lifetime version (K-SADS-PL) (22) via interview with the adolescent and separately with the parent. The K-SADS Depression Rating Scale (DRS) and Mania Rating Scale (MRS) (23) were used in place of the K-SADS affective disorders module to obtain more detailed mood symptom ratings. Established research-operationalized criteria were used to diagnose bipolar disorder NOS (18, 24) via elevated or irritable mood plus the following symptoms: two associated *DSM-IV* manic symptoms (three if only irritable mood); change in functioning; mood and symptom duration of at least 4 hours within a 24-hour period; and episode frequency of at least four lifetime cumulative 24-hour periods meeting the mood, symptom, and functional change criteria. Data from the COBY study provide strong support for the validity and reliability of these criteria (18, 25). Clinicians were trained in, and maintained reliability of, all measures (presence or absence of K-SADS-PL psychiatric disorders,  $\kappa \geq 0.8$ ; K-SADS mood items, intraclass correlation coefficient  $> 0.8$  for DRS and MRS) (26).

### Clinical Variables

Lifetime psychiatric hospitalization was coded on the K-SADS Summary Lifetime Diagnostic Checklist. Lifetime

suicidal ideation was positive if the intake K-SADS DRS suicidal ideation item summary score was rated  $\geq 3$  (mild) or if any Columbia–Suicide Severity Rating Scale (CSSRS) (25) lifetime suicidal ideation item was rated positive. In keeping with previous work (27, 28), we considered a past suicide attempt as any self-injurious act that reached or exceeded an operationalized threshold of lethal intent or medical lethality, assessed via the K-SADS DRS suicidal acts items, K-SADS Summary Lifetime Diagnostic Checklist suicide attempt item, or CSSRS lifetime suicidal behavior item.

### Health Care Use Data

As part of study consent, adolescents agreed to a review of their previous EHR data from University of Pittsburgh Medical Center (UPMC)–affiliated hospitals, clinics, physicians' offices, and emergency departments (EDs). UPMC is the largest health care provider in western Pennsylvania; it includes medical and specialty hospitals, a psychiatric hospital, outpatient psychiatric sites, a children's hospital, and affiliated outpatient pediatric primary and emergent care facilities. Thus, UPMC facilities serve as a major provider of all adolescent health care services. Although reliance on UPMC as the sole data source for our analysis risked omitting some health services provided outside of the UPMC system, a post hoc comparison of health service use estimated with EHR data with use assessed with self- and parent-reported data for five randomly selected adolescents during the 3 months before study intake indicated 100% agreement. Thus, data from the UPMC system may adequately represent services used.

### EHR Data Extraction

The data examined included outpatient behavioral health visits, outpatient medical health visits and associated procedures, inpatient behavioral health and associated procedures, inpatient medical health and associated procedures, ED visits (both behavioral and medical), and medication prescription records. Data were extracted from a data repository containing all clinical and financial records from UPMC hospitals, clinics, physicians' offices, and EDs (29, 30) in compliance with procedures for appropriate access, acquisition, and disposition of protected electronic health information for research purposes per system policy (31).

### Behavioral and Medical Health Services

The study team reviewed all inpatient hospital discharge abstract records and associated hospital charge transaction records for each patient–clinician encounter defined by a service; the team also reviewed prescription and visit diagnosis information from any outpatient visit over 12 months preceding study entry. Encounters were categorized as behavioral health services on the basis of visit type (e.g., behavioral health inpatient or outpatient), and all other encounters were considered general medical health services. Family services were included if the identified patient was

the participating adolescent. For those behavioral health services that can occur in a setting where multiple services may be provided as part of a visit type (e.g., medication management and intensive outpatient therapy), the charge transaction file was used to identify a specific service. Figure 1 presents the categorization of behavioral and medical health visits and the data source for each category. Data reflect service use only; we did not examine dropout or discharge from programs, length of service, or complexity of service.

### Medication Prescriptions

Adolescents' medications were generated from the prescription list in each outpatient encounter. The prescription list included those medications active at the time of the visit. Providers reviewed the prescription list at the beginning of each visit and updated it as appropriate (i.e., removed a medication that was no longer prescribed or taken, or they added any prescribed or taken medication that was not listed). Medication prescriptions were categorized as psychotropic or nonpsychotropic and were grouped by type according to categorizations used in previous work (24). Any medication prescriptions of unclear indication were reviewed by the study team.

### Statistical Analysis

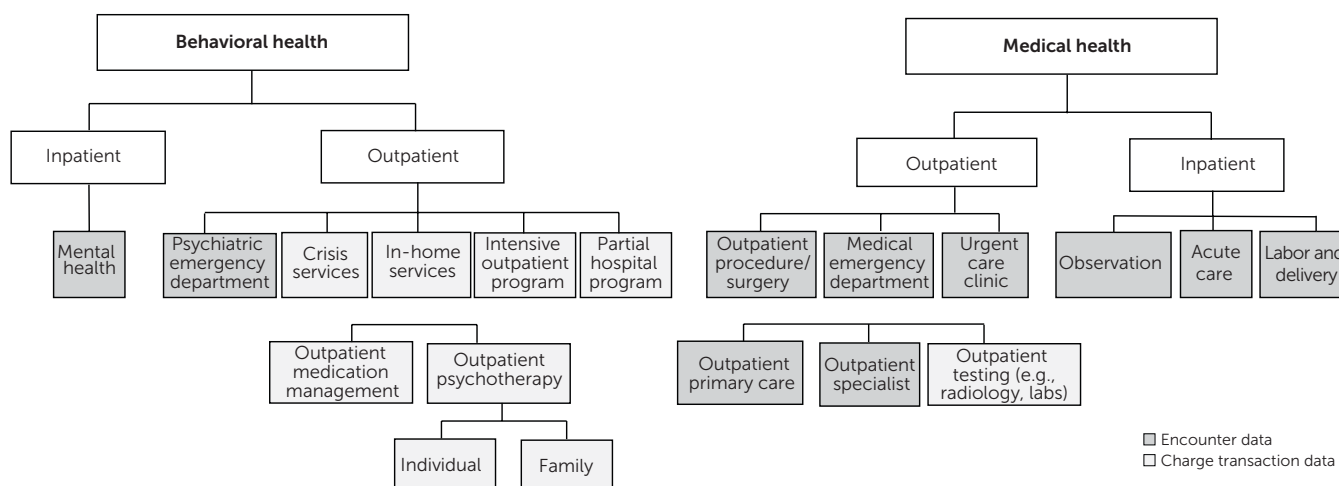
We performed data analyses with SAS, version 9.4, and the PROC FREQ and PROC TTEST procedures (32). We used *t* tests and chi-square tests to examine the statistical significance of differences in service use between adolescents with bipolar disorder type I or II and with bipolar disorder NOS.

## RESULTS

The sample included 100 adolescents with a mean  $\pm$  SD age of  $16.1 \pm 1.6$  years (demographic and clinical characteristics of the sample are presented in Table 1). Most self-identified as White (74%) and female sex at birth (85%). Per study inclusion criteria, all adolescents met *DSM-IV* criteria for bipolar spectrum disorder (bipolar disorder type I,  $N=14$ ; bipolar disorder type II,  $N=28$ ; and bipolar disorder NOS,  $N=58$ ). Co-occurring psychiatric conditions were common, and 62% reported a lifetime history of suicide attempt. No significant differences in demographic or clinical characteristics were detected between adolescents with bipolar disorder type I or II and with bipolar disorder NOS, except that the latter were less likely to have a co-occurring anxiety disorder at study intake.

### Behavioral Health Service Use

Nearly all adolescents (99%) had used some behavioral health service in the previous year, with a mean of  $22.5 \pm 20.1$  services used. The most commonly used service was outpatient psychotherapy (60%), followed by outpatient medication management (43%) and crisis services (26%). Of the

**FIGURE 1. Categorization and sources of behavioral health and general medical health data obtained from electronic health records used in this study**

adolescents, 19% visited the ED at least once for a behavioral health crisis, and 19% had at least one psychiatric hospitalization. No significant differences in hospitalization rates were detected between adolescents with bipolar disorder type I or II (17%) and with bipolar disorder NOS (21%). Use of other intensive behavioral health resources, including partial hospital programs (17%), intensive outpatient programs (18%), and in-home services (9%), and mean number

of visits are shown in Table 2. Overall, 49% had used at least one intensive behavioral health service in the previous year (i.e., inpatient, partial, intensive outpatient, psychiatric ED, or in-home services). No significant differences in behavioral health service use rate or mean number of visits (overall and for all behavioral health service types examined) were detected between adolescents with bipolar disorder type I or II and with bipolar disorder NOS.

**TABLE 1. Demographic and clinical characteristics of the adolescents diagnosed as having bipolar disorder at study intake, by bipolar disorder subtype<sup>a</sup>**

Variable	Total (N=100)	Bipolar disorder type I or II (N=42)		Bipolar disorder NOS (N=58)		Bipolar disorder type I or II vs. NOS	
	N	N	%	N	%	$\chi^2$ or t	p
Age (M $\pm$ SD years)	16.1 $\pm$ 1.6	16.4 $\pm$ 1.6		15.9 $\pm$ 1.7		1.84 <sup>b</sup>	.18
Male sex at birth	15	7	17	8	14	1.58 <sup>c</sup>	.69
Race						5.84 <sup>c</sup>	.21
White	74	34	81	40	69		
Black	17	4	10	13	22		
Asian	1	1	2	0	—		
Multiracial	6	3	7	3	5		
Undisclosed	2	0	—	2	3		
Hollingshead SES (M $\pm$ SD)	3.8 $\pm$ 1.1	3.9 $\pm$ 1.1		3.6 $\pm$ 1.1		1.83 <sup>b</sup>	.18
Behavioral health insurance coverage						1.40 <sup>c</sup>	.24
Private or commercial	55	26	62	29	50		
Medicaid	45	16	38	29	50		
Bipolar disorder age at onset, M $\pm$ SD	13.5 $\pm$ 2.9	13.6 $\pm$ 3.0		13.5 $\pm$ 2.8		.02 <sup>b</sup>	.89
N of intake diagnoses, M $\pm$ SD	1.7 $\pm$ 1.0	1.9 $\pm$ 1.0		1.6 $\pm$ 1.0		1.49 <sup>b</sup>	.23
Co-occurring psychiatric diagnoses at intake	90	40	95	50	86	2.21 <sup>c</sup>	.14
Anxiety disorder	75	36	86	39	67	4.43 <sup>c</sup>	.04
Behavioral disorder	33	11	26	22	38	1.52 <sup>c</sup>	.22
Substance use disorder	7	4	10	3	5	.71 <sup>c</sup>	.40
Lifetime suicidal ideation	92	41	98	51	88	3.11 <sup>c</sup>	.08
Lifetime suicide attempt	62	26	62	36	62	.00 <sup>c</sup>	1.0
Lifetime psychiatric hospitalization	46	17	40	29	50	.89 <sup>c</sup>	.35

<sup>a</sup> NOS, not otherwise specified; SES, socioeconomic status.

<sup>b</sup> t value; df=98.

<sup>c</sup>  $\chi^2$  value; df=1.

**TABLE 2. Behavioral and general medical health service use of the adolescents diagnosed as having bipolar disorder in the year preceding study intake, by bipolar disorder subtype<sup>a</sup>**

Variable	Total (N=100)		Bipolar disorder type I or II (N=42)			Bipolar disorder NOS (N=58)			Bipolar disorder type I or II vs. NOS: rate		Bipolar disorder type I or II vs. NOS: mean N of visits		
	N	N of visits (M±SD)	N	%	N of visits (M±SD)	N	%	N of visits (M±SD)	$\chi^2$ <sup>b</sup>	p	t	p	df
Any behavioral health service	99	22.5±20.1	42	100	25.0±22.8	57	98	20.8±18.0	.73	.39	1.03	.31	98
Any intensive behavioral health service <sup>c</sup>	49	4.0±10.7	20	48	4.2±10.0	29	50	3.8±11.2	.05	.81	.21	.84	98
Inpatient hospitalization	19	.29±.80	7	17	.33±1.05	12	21	.26±.55	.26	.61	.42	.68	57.2
Psychiatric emergency department visit	19	.21±.46	8	19	.19±.40	11	19	.22±.50	.00	.99	-.36	.72	98
Partial hospitalization program	17	.33±.82	7	17	.31±.72	10	17	.34±.89	.01	.94	-.21	.83	98
Intensive outpatient program	18	.32±.72	6	14	.29±.74	12	21	.34±.71	.68	.41	-.40	.69	97.6
Outpatient psychotherapy	60	2.2±4.2	27	64	2.2±3.2	33	57	2.2±4.8	.55	.46	.08	.93	97.6
Outpatient medication management	43	1.2±2.0	21	50	1.4±2.1	22	38	1.0±2.0	1.45	.23	.96	.34	98
In-home services	9	2.8±10.4	4	10	3.1±9.8	5	9	2.6±10.9	.02	.88	.24	.81	98
Crisis services	26	.49±1.19	11	26	.45±1.06	15	26	.52±1.29	.00	.97	-.27	.79	98
Other	2	.03±.22	2	5	.07±.34	0	—		2.82	.09	1.35	.18	41
Any medical health service	78	4.2±4.4	33	79	3.8±4.4	45	78	4.5±4.5		.91	-.83	.41	98
Inpatient hospitalization	4	.05±.26	3	7	.10±.37	1	2	.02±.13		.17	1.31	.20	42.5
Emergency department visit	39	1.1±2.2	13	31	.69±1.30	26	45	1.4±2.7		.16	-1.71	.09	87.3
Outpatient visit	67	3.1±3.4	27	64	3.0±3.6	40	69	3.1±3.2		.62	-.24	.81	98
Specialist visit	30	.66±1.50	11	26	.76±1.83	19	33	.59±1.21		.48	.54	.59	66.4

<sup>a</sup> NOS, not otherwise specified.<sup>b</sup> df=1.<sup>c</sup> Includes inpatient hospitalization, psychiatric emergency department, and partial hospitalization services as well as intensive outpatient and in-home programs.

### Medical Health Service Use

EHR data indicated that 78% of the sample had used some type of nonbehavioral health service in the previous year, with a mean of  $4.2 \pm 4.4$  total medical health visits. Outpatient visits were most common (67%), followed by ED (39%) and specialist (30%) visits. Only four adolescents in the sample were hospitalized for medical reasons, and each only once (Table 2). No significant differences in medical health service use rate or mean number of visits (overall and for all medical health service types examined) were observed between adolescents with bipolar disorder type I or II and with bipolar disorder NOS.

### Psychotropic Medication Prescriptions

Nearly half of the sample (48%) had at least one psychotropic medication in their EHR medication list during the previous year. Of the adolescents with any psychotropic medication listed, the average number of psychotropic medication types was 2.1; the most common medications were antidepressants (32%), antipsychotic medications (28%), and mood stabilizers (17%). Other psychotropic medication types included stimulants, anxiolytics, and lithium. Adolescents with bipolar disorder type I or II did not differ in psychotropic medication rates or mean

number of types from those with bipolar disorder NOS (Table 3).

### Nonpsychotropic Medication Prescriptions

Fifty-nine adolescents had at least one nonpsychotropic medication listed in their EHR in the preceding year, with an average of 4.9 nonpsychotropic medications. The most commonly listed nonpsychotropic medications included albuterol (12%), fluticasone propionate (12%), tretinoin (10%), and amoxicillin (9%) (Table 3). The only medication listed at statistically significant differential rates between the bipolar subtypes was hydroxyzine, which was listed more often for adolescents with bipolar disorder type I or II (14%) than for those with bipolar disorder NOS (3%).

## DISCUSSION

Past-year service use data from this treatment-seeking sample of predominately female (85%) adolescents diagnosed as having bipolar disorder with the use of evidence-based assessment methods showed nearly ubiquitous use of behavioral health services (mainly outpatient psychotherapy) and high rates of general medical service use (mainly outpatient primary care). Nearly half of the adolescents had



**TABLE 3. Psychotropic and nonpsychotropic medications in electronic health records of the adolescents diagnosed as having bipolar disorder in the year preceding study intake, by bipolar disorder subtype<sup>a</sup>**

Medication type	Total (N=100)	Bipolar disorder type I or II (N=42)		Bipolar disorder NOS (N=58)		Bipolar disorder type I or II vs. NOS: rate	
	N	N	%	N	%	$\chi^2$ <sup>b</sup>	p
Any psychotropic medication	48	21	50	27	47	.12	.73
Antidepressant	32	16	38	16	28	1.24	.27
Mood stabilizer	17	8	19	9	16	.22	.64
Antipsychotic	28	10	24	18	31	.63	.43
Stimulant	11	3	7	8	14	1.10	.29
Anxiolytics	8	4	10	4	7	.23	.63
Lithium	6	3	7	3	5	.17	.68
Mean N of types	2.1	2.1	2.1	2.2	2.2	-.18 <sup>c</sup>	.86
Any nonpsychotropic medication	59	26	62	33	57	.25	.62
Albuterol	12	4	10	8	14	.42	.52
Fluticasone propionate	12	3	7	9	16	1.62	.20
Tretinoin	10	7	17	3	5	3.58	.06
Amoxicillin	9	5	12	4	7	.75	.39
Melatonin	9	2	5	7	12	1.59	.21
Hydroxyzine	8	6	14	2	3	3.89	.05
Ibuprofen	8	4	10	4	7	.23	.63
Sulfacetamide sodium-sulfur	8	5	12	3	5	1.50	.22
Mean N of types	4.9	5.0		4.8		.19 <sup>c</sup>	.85

<sup>a</sup> NOS, not otherwise specified.<sup>b</sup> df=1.<sup>c</sup> Value is a t statistic.

received a prescription for a psychotropic medication in the preceding year, whereas 59% had been prescribed a nonpsychotropic medication. Service use rates were similar for adolescents with threshold bipolar disorder (type I or II) and with bipolar disorder NOS (derived via operationalized criteria), lending further support for the clinical burden and illness severity associated with bipolar disorder NOS among youths.

In our study sample, 99% of participants had received any behavioral health treatment in the previous year, compared with 80% in naturalistic studies of youths with bipolar disorder (8) and 62% in community studies (33). These differences are likely best understood by the fact that the sample in our study sought treatment. Previous findings suggest that youths with bipolar disorder who seek behavioral health treatment have more severe symptoms and functional impairment, as well as greater comorbid conditions and suicidality, than those who do not (33), observations in keeping with the clinical characteristics of this sample (8, 33–36).

Among outpatient behavioral health services, psychotherapy was the most commonly used modality, an observation similar to findings from longitudinal data of the COBY study (37). Although rates of psychotherapy use in our study were similar to those previously reported in a study using chart review (13), the rate of medication management visits was lower (43% vs. 99%) in our study than in the previous one. Adolescents in our sample specifically agreed to participate in a psychotherapy study, possibly indicating a preference for psychotherapy over medication. Nearly half (48%) had at least one psychotropic medication listed in

their EHR in the previous year, most commonly an antidepressant. Practice guidelines recommend antidepressant use in the presence of a mood-stabilizing medication because of the risk for manic induction (38). However, the extent to which the patients in our sample used medication according to evidence-based treatment guidelines was not known because of the methods used in our study (39, 40). These findings highlight the need for further data to investigate adherence to evidence-based treatment guidelines for early-onset bipolar disorder.

Adolescents diagnosed as having bipolar disorder type I or II did not differ from those with bipolar disorder NOS in the overall number or types of psychotropic medications in the previous year. Hirneth et al. (20) found that youths with bipolar disorder type I used larger amounts of psychotropic medications than youths with bipolar disorder NOS, but these authors used cross-sectional data, and the bipolar disorder NOS criteria differed from those applied herein. It is possible that the similar prescribing patterns observed among bipolar subtypes in our study reflected similar overall clinical presentation and severity of bipolar subtypes, as evidenced by similar age at onset, rates of comorbid conditions, suicidal behavior, and hospitalizations.

Although adolescents with bipolar disorder represent a relatively small proportion of psychiatric patients, previous studies have indicated that they account for a disproportionately large percentage of psychiatric inpatient hospitalizations (41). In our sample, 19% had at least one psychiatric hospitalization in the previous year, compared with 30%–40% previously reported among privately insured

youths with bipolar disorder (diagnosis per claims data) (7, 10) and nearly 60% in one study (which used chart review) (13). Additionally, although some studies have reported higher rates of psychiatric hospitalization among youths with bipolar disorder type I compared with bipolar disorder NOS (18, 20), no differences in psychiatric hospitalization were observed among the different bipolar subtype groups in this sample. Previous studies have reported considerable inpatient hospitalization and expenses specifically attributable to suicide attempt among adolescents with bipolar disorder (7, 8, 29). Thus, the lack of differences between bipolar subtypes in suicide attempt rates in the sample of this study may explain the comparable rates of hospitalization among patients in these subtype groups. Thus, suicide risk (possibly more so than mania) among youths with bipolar disorders may have substantial implications for health system approaches, clinical management, and cost in the management of early-onset bipolar spectrum disorder.

Our findings may also reflect increased efforts to use less restrictive treatment settings for the management of suicide risk in recent years (42). Indeed, nearly half of the sample used other intensive behavioral health services, including crisis services, partial hospitalization services, and intensive outpatient programs; yet, most previous studies did not report on such services. These interim levels of care may function to prevent inpatient hospitalization for this population (43). Similarly, intensive evidence-based psychotherapy approaches for adults with bipolar disorder are associated with decreased risk for psychiatric hospitalization (40). A forthcoming randomized trial of one such intervention (dialectical behavior therapy) (44) for adolescents with bipolar disorder will examine this possibility.

Of the sample in this study, 78% used some type of general medical health service in the previous year. Outpatient primary care visits were most common (67%). Dusetzina et al. (7) also found high rates of nonbehavioral health outpatient visits among youths with bipolar disorder. Medical nonbehavioral ED visits (39%) and medical outpatient specialist visits (30%) were also common, highlighting significant co-occurring medical conditions. As such, adolescents with bipolar spectrum disorders should be carefully assessed for general medical and psychiatric risks (4). Furthermore, as advocated by Aarons et al. (5), interdisciplinary communication is critical. The evidence-based coordinated specialty care model implemented in first-episode psychosis (45) promotes shared decision making between the patient and a team of specialists and may be a promising delivery model for the management of early-onset bipolar disorder.

Our findings should be considered within the context of some study limitations. Primarily, the sample included adolescents who consented to participate in a psychosocial treatment study. As such, their service use may not reflect uses in community samples. Given data indicating no sex differences in rates of early-onset bipolar spectrum disorder (46), the overrepresentation of females in the sample of our

study may be explained by findings that females are more likely to seek psychotherapy (47). Yet, use of this sample enabled confirmation of bipolar spectrum disorder diagnosis from a semistructured interview, a significant strength compared with many previous studies that relied only on EHR diagnoses.

Other limitations included a primarily White sample. Given evidence of health care disparities in bipolar disorder (48), further examination in more diverse samples is warranted. Because this study relied on data from within one large system of care in western Pennsylvania, it is possible that adolescents used additional services outside of this system that were not captured. Yet, we note that compared with self-reported service use data, such objective data are more reliable (49) and may provide a higher degree of granularity. We also did not have information on services covered under adolescents' insurance plans, which may have influenced service use. However, under the Affordable Care Act, public and private insurers are required to cover mental health services at parity with general medical benefits (50). Future studies may further expand on this work by examining lifetime service use (compared with previous year) to enhance the understanding of patterns of service use over time.

## CONCLUSIONS

The findings of this study regarding use of behavioral and medical health services among adolescents with bipolar disorder highlight the critical importance of coordinating health care for this high-risk, high-service-use population to improve treatment outcomes. Implications apply equally to adolescents with bipolar disorder type I or II and bipolar disorder NOS, given their similar patterns of service use. Future data indicating cost-effectiveness of intensive treatments, as justified by superior and sustained long-term patient outcomes, may enhance access for this population.

## AUTHOR AND ARTICLE INFORMATION

Department of Psychiatry (Goldstein, Sylvester, Rode) and Department of Medicine (Saul), University of Pittsburgh Medical Center, Pittsburgh; Department of Public Health, University of Pittsburgh, Pittsburgh (Nagy, Donohue). Send correspondence to Dr. Goldstein (goldtr@upmc.edu).

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## Promoting High-Value Mental Health Care Column Invites Submissions

**Coeditors: Marcela Horvitz-Lennon, M.D., and Kenneth Minkoff, M.D.**

The editors of the Promoting High-Value Mental Health Care column seek submissions focused on (a) emerging and promising behavioral health screening, assessment, or treatment practices and (b) clinical, organizational, or policy interventions aimed at improving quality of mental health care. Examples of such interventions include (but are not limited to) those that seek to promote the uptake of underused evidence-based practices, reduce the overuse of interventions lacking supporting evidence, improve the safety and efficiency of mental health care, and improve processes and outcomes of care through data-driven continuous quality improvement and population management strategies. Submissions must include some evidence of feasibility or effectiveness of the intervention.

Submissions (via [mc.manuscriptcentral.com/appi-ps](https://mc.manuscriptcentral.com/appi-ps)) are limited to 2,400 total words, inclusive of a 100-word abstract, two or three one-sentence Highlights, and up to 10 references.