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Increased Rates of Bipolar Disorder Diagnoses among U.S. Child, Adolescent, and Adult Inpatients, 1996-2004

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Abstract

BACKGROUND—Volatile, aggressive behavior is the chief complaint that brings children to inpatient psychiatric care. These difficulties are increasingly conceptualized as bipolar disorder (BPD). The impact of doing so on clinical diagnoses in clinical care is uncertain.

METHOD—We extracted records from the annual National Hospital Discharge Survey for which a psychiatric diagnosis was primary and examined trends in the rates of hospitalization associated with BPD.

RESULTS—Population-adjusted rates of hospital discharges of children with a primary diagnosis of BPD increased linearly over survey years. The rate in 1996 was 1.3 per 10,000 U.S. children and climbed to 7.3/10,000 in 2004. BPD-related discharges also increased four-fold among adolescents. Adults showed a more modest, though still marked, rise of 56%. BPD-related hospitalization was more prevalent among female adolescents and adults, while male children had larger risk than females. Children's BPD diagnoses tended not to specify a prevailing mood state, while depression and psychotic features were the most common codes for adults. Black individuals, especially men, had lower rates of BPD diagnoses in early survey years, but more recently their rate of BPD-related hospitalizations has exceeded other NHDS race groups.

CONCLUSION—Higher rates of inpatient admissions among youth associated with BPD may reflect greater appreciation of the importance of affective dysregulation in this patient group or "upcoding" to putatively more severe conditions for reimbursement or administrative reasons. Further study is warranted to examine this shift's causes and implications for treatments and outcomes.

Keywords

Bipolar disorder; inpatients; children; adolescents; prevalence; diagnosis

Introduction

Volatile, aggressive behavior is the chief complaint that most often brings children to inpatient psychiatric care (Blader in press, Gutterman 1998, and Nicholson et al 1998). These difficulties usually represent an escalation of long-standing behavioral dyscontrol that develops alongside chronic impulsivity and affective dysregulation (Bickman et al 1996, Blader and Foley 2007, Blader and Jensen 2007, Vivona et al 1995, and Zimet et al 1994).

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This diathesis of impulse control deficits and affective instability in young people is now often conceptualized as bipolar disorder (BPD) (Leibenluft et al 2003). However, there is broad recognition that the phenomenology of this presentation, and perhaps its course and prevalence, differ from BPD seen in adults (Leibenluft et al 2003, Patel et al 2006). Positive affective features (e.g., euphoria, expansiveness, supreme self-confidence, self-importance), in the sense of sustained high hedonic tone is rarely seen among children. Intense, mission-driven efforts to undertake projects, however ill-conceived, that such affect motivates in adults are also rare among children (Carlson and Meyer 2006). Instead, vigorous and hurried activity appears to provide momentary excitement without much goal-direction. Of course, this is a generic feature of attention-deficit/hyperactivity disorder (ADHD), whose diagnostic criteria these children readily fulfill (Carlson 1998).

Affected children only seldom experience mania or major depression in the episodic manner of “classic” BPD (Geller et al 1998 and Leibenluft et al 2003). Behavior troubles may intensify or abate within a given week or month, and explosions are intermittent, but such oscillations differ from demarcated episodes of illness that better typify the major mood disorders of adulthood. This childhood pattern of chronic behavioral volatility and poor frustration tolerance appears often among children who would meet diagnostic criteria for disruptive disorders, in particular oppositional defiant disorder, which ADHD frequently accompanies and half of whose DSM-IV symptoms involve hostile affect.

Some preliminary genetic, brain morphometric, and functional brain findings suggest an association between severe behavioral disturbances of children and potential biomarkers and endophenotypes of BPD, but inconsistencies across studies handicap their conclusiveness (Althoff et al 2005, Blumberg et al 2003 2005 2006, Caetano et al 2005, Chang et al 2005, DelBello et al 2004 2006, Faraone et al 2003, Friedman et al 1999, and Lyoo et al 2002). Phenotypic heterogeneity among youth diagnosed with BPD is likely to hamper a definitive account of the early development of severe mood disorders, particularly because a leading feature, affective dysregulation, is both prevalent and characteristic of several psychiatric disorders of childhood (Brotman et al 2006).

Misspecification of who has a disease (low specificity) is generally more damaging to scientific inference than underdetection (low sensitivity) (Franco and Rohan 2002). Rigorous, precise, and accurate evaluation criteria are integral to this effort. However, community diagnostic practices are also relevant.

First, identification of eligible participants for research often depends on clinicians, so their perceptions of who has and does not have a disorder can influence recruitment. Second, trends in longitudinal data may illuminate systematic sources of over- or under-identification, if the prevalence of one diagnostic group increases or decreases alongside an opposing trend for a phenotypically similar disorder. Third, community diagnostic patterns may reveal aspects of the condition (differential prevalence in demographic subgroups, rates of subtypes and associated features) for which pathophysiological explanations need account. Fourth, clinical research involving carefully selected participants may not generalize to other treatment settings where clinicians to apply diagnoses more broadly among patients with less rarefied, “pure” forms of a disorder; some appreciation of community diagnostic practices helps to reconcile this divide. Lingering uncertainty about the psychopathology that scaffolds the severe behavioral disturbances of child and adolescent psychiatric inpatients makes this an especially important group to consider in this regard.

This study examined a national database of hospital discharges between 1996 and 2004 to discern trends in the clinical diagnoses of children and adolescents admitted to inpatient psychiatric care. We determined population-adjusted rates of BPD diagnoses for comparison

with other conditions, the prevalence of illness subtypes and specifiers, rates of BPD as a function of demographic factors, and secondary diagnoses that accompany primary diagnoses of BPD. To provide a comparative framework, we ascertained hospitalization trends for adults over the same period.

Methods

Data Source

The National Hospital Discharge Survey (NHDS) is a component of the National Health Care Survey which the National Center for Health Statistics (NCHS), a branch of the U.S. Centers for Disease Control and Prevention (CDC), conducts annually. The NHDS captures patient-level information pertaining to discharges during the calendar year from non-Federal general hospitals and children's hospitals, regardless of length of stay, and other, more specialized hospitals whose average length of stay is less than 30 days. Hospitals chosen constitute a probability sample in which the likelihood of a facility's selection is proportional to its total number of discharges and the population of the surrounding community (Dennison and Pokras 2000). Within facilities, the sampling of specific discharges aims to achieve proportional representation of diagnostic groups, age groups, gender, and time of year.

NHDS acquires raw data from electronic medical records that the hospital or a subcontractor maintains and, when electronic formats are not available, by manual transcription from patients' medical records. Between 1996 and 2003 the number of discharges that constituted each year's final data set ranged between 282,008 and 319,530. The 2004 data set was substantially larger, comprising 370,785 observations. NCHS makes each year's NHDS raw data publicly available. Raw data sets after 1995 are accessible via Internet download (ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Datasets/NHDS), and this source provided the data for the present report.

Each observation in the data set represents an anonymous individual patient and contains variables that characterize patients' demographics (e.g., age, gender, Federal category for race, region of residence, marital status), clinical status (e.g., diagnostic and procedure codes, status at discharge), administrative factors (e.g., payer, dates of admission and discharge), and the hospital (e.g., ownership, number of beds).

Each observation also includes a weight that enables extrapolation from the sample to an estimate of population frequencies. Documentation that accompanies each year's data set provides estimates of the U.S. civilian population on July 1st of its respective year stratified by gender, race, age and region, along with select cross-tabulations based on these factors. Together with the weights found on each record, one can derive estimates of rates with which events occur in the population (e.g., number per 1,000 persons).

A single individual may have contributed more than one observation to an annual dataset if he or she experienced more than one hospital discharge during the year and if NHDS sampled both. Therefore, estimates of totals and rates refer only to discharges, not unique persons.

Data Extraction and Coding

We identified discharges associated with a psychiatric disorder by extracting records for which the primary diagnosis was a code from the clinical modification of the ninth revision to the *International Classification of Diseases* (ICD-9-CM; National Center for Health Statistics 2006) between 290.00 and 333.99. Despite its name and origins, ICD-9-CM is an American coding system promulgated by the U.S. Government. Its mental disorders section has been entirely congruent with DSM-IV since the latter's publication in 1994 (American Psychiatric Association 1994).

We categorized discharges culled on this basis into one of nine groups, comprising: 1) substance-related disorders, 2) depressive disorders (including major depressive disorder with and without psychotic features and dysthymia), 3) bipolar disorders, 4) anxiety disorders, 5) conduct problems (oppositional defiant disorder, conduct disorder, intermittent explosive disorder, and attention-deficit hyperactivity disorder), 6) psychoses (all schizophrenic disorders, delusional disorder, psychotic disorder NOS), 7) developmental disorders (pervasive developmental, mental retardation), 8) acquired cognitive disorders (e.g., dementias), and 9) psychophysiological disorders (eating disorders, pain judged psychogenic, sleep disorders, and somatoform disorders).

NHDS records in whole years patients' ages at discharge. This study employed three age groupings: "Children" were those aged 5 to 13 inclusive, "Adolescents" were between ages 14 and 18, and "Adults" had ages of 19 and older. Analyses excluded discharges of persons over age 64 and those for whom discharge status indicated death.

Summing the weights of all observations for which a psychiatric disorder appeared as the primary diagnosis yields an estimate of the total number of discharges from acute-care facilities during the survey year. Dividing this estimated total number of discharges by the corresponding year's U.S. population estimate for each age group, provided in the NHDS's documentation, permits computation of annual hospitalization rates for children, adolescents and adults.

Statistical Analyses

We calculated three indices from NHDS data and the accompanying population estimates to represent rates in the diagnosis of BPD for the three age groups. 1) The proportion of discharges with a primary clinical diagnosis of a psychiatric disorder that had BPD as the primary diagnosis. 2) The rates of bipolar disorder-related discharges per 10,000 persons in the general population for the respective age group, in relation to similar rates for other psychiatric disorders. 3) The ratio of bipolar disorder-related discharges for each age stratum relative to other primary diagnoses for the same group.

Logistic regression examined potential predictors of bipolar disorder inpatient diagnoses, and whether these variables moderated any main effects of age and time (survey year) that might be present. These analyses considered the possible influence of gender, ethnicity, and the U.S. region of the reporting facility.

Results

Overall Psychiatric Hospitalizations

Over all survey years, the proportion of discharges of patients aged 5 to 64 for which a psychiatric diagnosis was primary was 6.91%.

Psychiatric disorders came to represent a slightly larger proportion of the total hospital discharges between 1996 (6.87%) and 2004 (7.06%). The linear trend over survey years was appreciable ($r = .39$), but adolescents and children accounted for most of the increase. Among adolescents, psychiatrically-associated discharges constituted 13.64% of that group's total in 1996, but grew steadily to represent 18.91% by 2006 ($r = .77$). Children also showed a substantial rise in psychiatrically-related hospital discharges, from 7.51% to 9.68% ($r = .66$). Adults proportions over survey years averaged 6.50% with little, nonlinear, fluctuation ($sd. = .341\%$).

Population-based rates of psychiatrically-related discharges grew considerably for children and adolescents. Discharges of children displayed a 53.2% increase from 13.9 discharges per 10,000 children in 1996 to 21.4 per 10,000 in 2004. Adolescent psychiatric discharges exhibited

comparable growth of 58.5% between the same two years, from 49.8/10,000 to 78.9/10,000. By comparison, the rate of psychiatrically-related hospital discharges among adults increased 3.3% (105 discharges per 10,000 in 1996 to 108.5 per 10,000 in 2004).

Rates of Discharges with BPD as Primary Diagnosis

Against this background of generally rising inpatient events related to psychiatric conditions, discharges carrying a primary diagnosis of BPD increased markedly among children and adolescents. Figure 1 shows the rates of discharges among children, adolescents, and adults per 10,000 of their respective populations. Sections of each year's bar indicate the proportion of discharges for which each major diagnostic group accounts. Table 1 presents the percentage change in discharges for diagnostic groups in 2004 relative to 1996 and the correlation coefficient for the linear trend.

As a proportion of the total of psychiatrically-related discharges, children diagnosed with bipolar disorder constituted 10% in 1996 and rose to 34.1% of the total by 2004 (see Figure 1). Specifically, there were 1.4 discharges with BPD diagnosis per 10,000 children in the general population; by 2004 there were 7.3 per 10,000. Table 2 shows that the correlation between annual population-adjusted rates and survey year points to a strong linear trend throughout the period (*viz.*, $r = .89$, $df = 7$, $p < .01$).

The trend for adolescents exhibits a similar leap, whereby BPD-associated discharges assume greater prominence among all psychiatric discharges and become more prevalent in the population. In 1996, there were 5.1 discharges with a primary diagnosis of bipolar per 10,000 adolescents, which represents 10.24% of the 49.8 total psychiatrically-related discharges per 10,000. In 2004, there were 20.4 discharges per 10,000 adolescents, or 25.86% of the total. The linear trend is also steady, which the .80 correlation between year and rate reflects ($df = 7$, $p < .01$).

Among adults, discharges related to bipolar disorder also increased more than for other psychiatric conditions. Prevalence rose from 10.4 discharges per 10,000 in 1996 to 16.2 per 10,000 in 2004, and the increase was strongly linear through that interval ($r = .80$, $df = 7$, $p < .01$). As a proportion of all psychiatrically-related discharges, those with a primary diagnosis of bipolar disorder went from 9.9% in 1996 to 14.9% in 2004.

BPD Subtypes and Episode Specifiers

Among discharges with primary diagnoses of BPD, the proportions of specific subtypes and of specifiers for the episode appear in Figure 2. After 1996, the proportions shown derive from the averages of two consecutive years in order to depict trends less affected by single-year spikes or dips. For this purpose, the Psychotic category comprised all episodes with psychotic features regardless of mood state. The Manic category combines hypomanic with manic episodes. The "Other" category included discharges with diagnoses containing full or partial remission specifiers, which would be incongruous as a reason for admission and may result from erroneous substitution of patients' discharge diagnosis for their admission diagnosis.

For adult patients, the distributions of BPD subtypes remained quite stable over the survey years. In contrast, children's BPD diagnoses consistently had a far lower proportion of episodes designated specifically as manic or depressed. Prior to 2001, BPD with psychotic features appeared with annual frequencies under 7% of the children's total with a primary diagnosis of any BPD but from 2001 through 2004 this rate has not been below 15%. The trend among adolescents more closely resembles the adult pattern, with depressive episodes accounting for a large portion of hospitalizations, yet also showing the large increase in episodes with psychotic features in the last two survey years. It is noteworthy that primary diagnoses

designated as manic episodes are fewer than 20% of adult BPD discharges and generally far below that for children and adolescents. Bipolar I disorder, unspecified, accounted consistently for a substantial proportion of BPD-related hospital discharges among all age groups, but particularly for children.

Demographic Correlates of BPD Diagnosis Over Survey Years

Figure 3 presents the rates of BPD-associated discharges per 10,000 of six demographic subgroups formed by crossing the three NHDS race categories with gender. Bipolar disorder appeared very infrequently among white girls prior to 2001, then rose to approximate or exceed the rates for boys. In the 1999-2000 survey years, the gender situation was reversed among black children, where girls exceeded boys. In the two most recent survey years (2003-2004), BPD-related discharges among black children increased markedly for both boys and girls and come to exceed the rates among white boys and girls. For adults, rates of BPD-related discharges are generally higher among females within each NHDS race group. However, from 2001, the gender gap closed among black patients, chiefly the result of a large increase in the rate of BPD-related discharges among black males which by 2003-4 exceeded those for white males. Adolescent BPD-related discharge rates reflect a combination of the child and adolescent trends: A large increase among whites followed by a pronounced rise in rates for blacks of both genders, although blacks are the only group in which BPD-related discharges came to have higher rates among males than females.

Table 2 shows the results of logistic regression that estimates the odds ratios that BPD is the primary diagnosis for a discharge for demographic and other variables. The table presents odds ratios adjusted for other predictors and interactions, and is stratified by age group. Analyses also adjusted for the population rate of psychiatrically-related discharges for each gender and NHDS race grouping.

The effect of Year confirms the strong linear trend for children, for whom the adjusted odds ratio that a hospital discharge carried a primary diagnosis of BPD increased an average of .25 annually. Whereas being male incurred a lower probability of a discharge with a diagnosis of BPD for adults, male children had an elevated odds ratio. Over all nine survey years, Black children and black adults were less likely to have a BPD-diagnosed discharge, and the significant Race by Sex interaction shows that Black males had even lower odds of BPD-related discharge. However, as Figure 3 suggests, the rate of increase among Black male children and adolescents was quite pronounced in the latter survey years, evidenced in the triple interaction (Race by Sex by Year).

Children whose care was funded by a government program, chiefly Medicaid, were less likely to incur a BPD-diagnosed discharge. However, Medicaid-funded hospital care for Black *children* was strongly associated with BPD diagnosis.

Secondary Diagnoses for Discharges with Primary Diagnosis of BPD

Discharges of adolescents and adults recorded a secondary diagnosis for 44.16% of the observations with a primary diagnosis of BPD, averaged over the nine survey years (sd over years = 4.28%). Secondary diagnoses in these instances were overwhelmingly substance abuse disorders, representing 80.84% of those with any secondary diagnosis coded and 35.7% of all discharges of adolescents and adults with BPD. Depressive disorders were the secondary diagnosis for 4% of BPD-related discharges of adolescents and adults, and anxiety disorders appeared as secondary for less than 1%.

Among children's discharges with primary BPD, 37.5% carried secondary diagnosis, but with far less temporal consistency in both their rates and types relative to adolescents and adults (sd

over survey years = 15.03). Substance abuse appears as a secondary diagnosis among 18.42% overall, but seems to be an unreliable estimate ($sd=16.96$), with no trend over time. Conduct problems or ADHD appeared as a secondary diagnosis in 5.76% of the discharges of children with BPD as the primary diagnosis, but again there is huge year-to-year variation ($sd=8.03$).

Discussion

A very large increase in the number of discharges from acute-care settings with a primary diagnosis of BPD occurred among children and adolescents between 1996 and 2004. BPD was one of the least frequent diagnoses recorded among child inpatients in 1996, but was the most common in 2004. Among adolescents in 1996, there were twice as many discharges with a depressive disorder as with a BPD diagnosis, but by 2004 the rates were about equal. These increases significantly outpace the more modest rise in BPD among adults over the same period.

The survey years considered in this report coincided with payers' efforts to constrain the use of costly inpatient services by stringent review in order to admit only patients who were utterly unamenable to safe management as outpatients. A rise in the proportion of admissions for more severe or dangerous behavioral disturbances, such as those common in BPD, might therefore appear even if diagnostic practices had remained the same. However, this study's evaluation of hospitalization *rates* as a proportion of the population for each age group buttresses confidence that its findings do not artifactually arise because managed care progressively shunted less ill individuals from hospital admission.

Several phenomena may account for the growth in the assignation of BPD diagnoses to children discharged from inpatient care. Shorter lengths of stay may entail higher rates of readmissions (Wickizer et al 1999). Because hospital discharges, not unique individuals, are the units of NHDS reporting, a portion of the increase might derive from more frequent rehospitalizations of those diagnosed with BPD. Although a potentially important contributor, this possibility is unlikely to explain the five-fold increase found only for this condition.

A second possibility is that clinicians now detect more BPD cases among youth and have become more apt to refer for inpatient care those who they previously might have regarded as evincing "only" conduct problems or troubled parent-child relationships. Nevertheless, it seems implausible that clinicians have become more alarmed by the harmful behavior disturbed youngsters display, and feel that hospitalization has become a more appropriate intervention, solely because these problems may represent a form of BPD.

Lastly, growth in the rate of BPD-diagnosed discharges might reflect a progressive "re-branding" of the same clinical phenomena for which hospitalized children previously received different diagnoses. The unchanged rate of conduct problem diagnoses over survey years represents an effective decline in light of the marked rise in overall population-adjusted rate of children's psychiatric discharges. Clinicians may have responded to the higher hurdles for obtaining payer's authorization for inpatient care by "upcoding" severe behavioral disturbances to a major mood disorder that connotes a more pernicious illness.

We suggested that community diagnostic practices have relevance for neuropsychiatric research, and this study's findings hold specific implications for efforts to understand affective regulation problems among children.

First, clinicians may refer to studies of early-onset BPD a number of children likely to manifest broader phenotypes of psychiatric illness than those customarily associated with later-onset BPD. More families may now identify their child's illness with BPD as well. It behooves investigators to scrutinize the appropriateness of that characterization for the research purpose at hand. Besides high clinical heterogeneity in patients referred by clinicians to studies of BPD,

our data also suggested potential racial factors in BPD diagnosis that may affect recruitment. Demographic differences in BPD diagnoses in the earlier survey years showed lower rates among Black individuals, and Black males even more so, than among those in the White and Other NHDS race groups. This result echoes the similar discrepancies in diagnostic rates between racial groupings reported in adults (Kunen et al 2005, Neighbors et al 2003, and Strakowski et al 2003) and adolescents (Delbello et al 2001), but not previously reported among preadolescents. However, the latest three NHDS years show a steep increase in BPD discharges, especially for Black males. It would be a positive development if this trend corrects a bias that led to misdiagnosis in the past. In any event, the very existence of such dramatic swings underscores potential caprice inherent in current clinical diagnostic practices. The efforts of neuropsychiatric research to be inclusive and generalizable, while at the same time achieving the requisite specificity in case identification, stand to suffer if nonclinical factors distort the cohort of potential participants.

Second, trends over survey years intimated that increasing rates of BPD may represent a reconceptualization of youth previously diagnosed with conduct-related disorders. It therefore seems important to clearly delineate 1) how BPD differs phenomenologically from these other conditions, and 2) to include comparison groups of youngsters with ADHD comorbid *with* ODD or CD, whose emotional lability is well-appreciated (Brotman et al 2006). These comorbid ADHD+ODD/CD cases are important, because comparing children diagnosed with BPD to children with uncomplicated ADHD might well amount to an assessment of ADHD vis-à-vis ADHD with a comorbid disruptive disorder.

Third, these data confirm that children whom clinicians diagnose with BPD differ in significant ways from adults so diagnosed. Sex differences showing higher rates of BPD-related discharge among male children, but a predominance of females among adults, hint at a different disorder. Depression and psychoses are the acute problems that seem most often to occasion admission of adults, and fewer than 20% of discharges in each survey year contained the mixed-states specifier. For children, by contrast, depression is very uncommon as the prevailing mood disturbance in the context of BPD, and rates of psychosis have been too unstable over survey years to ascertain a reliable estimate. Throughout survey years, subtypes and episode specifiers for children have demurred from stating specific manic or depressive episodes. Bipolar I unspecified, was consistently more common among children than adults. Although this diagnosis denotes a specific major episode that falls short of duration criteria, its high prevalence alongside the high rates for mixed episodes suggests that well-delineated episodes characterized by a single dominant mood are uncommonly identified among hospitalized youth.

From a clinical standpoint, it is unclear how the pharmacotherapy of children admitted to inpatient care may have changed alongside higher prevalence of BPD-related discharges. A primary BPD diagnosis for a child with ADHD may dissuade clinicians from stimulant therapy, despite evidence that children with manic symptoms seem not to demonstrate behavioral toxicity with stimulant treatment, and benefit from improved attention and impulsivity, alone or under the cover of an antimanic agent (Carlson et al 2000 and Scheffer et al 2005). A recent naturalistic study of behaviorally volatile children discharged from an inpatient service found large effects on externalizing behavior for treatment with stimulants, after controlling for baseline severity and coadministered medications (Blader 2006). At the same time, antimanic and antipsychotic agents, many of which now have indications for mania, have for many years held a prominent role in the clinical pharmacotherapy of aggressive youth (Blader and Jensen 2007). However, the evidence base to support their use among volatile, nonpsychotic children without major developmental handicaps remains slim, especially in combination with other agents which is the most common context for their use among hospitalized youngsters (Blader 2006). The differences between adults and children diagnosed with BPD found in this study

and elsewhere would justify skepticism for claims that agents with some evidence of efficacy among adults who have BPD are necessarily appropriate for children said to have the disorder.

All areas of clinical medicine both reflect and influence the social context of the time and place of their practice, and psychiatric diagnosis has particularly profound social implications. If clinical phenomena previously diagnosed as primarily disruptive behavior are more often designated as BPD, the attributional framework for severe behavioral volatility could change considerably. Specifically, a major mood disorder universally recognized as a neuropsychiatric illness would in essence supplant as an explanatory framework the sociogenic or volitional accounts still widely associated with disruptive disorders. A shift that appears to ascribe less blame to families and patients would likely find favor. It may also accelerate development and adoption of psychosocial treatment strategies that de-emphasize punitive consequences for misbehavior and focus instead on environmental adaptation, coping, and lifeskills development to mitigate the impact of the disorder for patients and families (Ducharme et al 2000, Greene and Ablon 2006, and Pavuluri et al 2004). Nonetheless, adoption of psychiatric diagnoses for these purposes may inflate estimated prevalence and overbroaden phenotypic and genotypic variability in identified patient populations, and thereby confound efforts to improve understanding and treatment of the illnesses that afflict youth with severe mood and behavioral disturbances.

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FIGURE 1.

Number of U.S. Acute-Care Inpatient Discharges per 10,000 Children, Adolescents and Adults with a Principal Diagnosis of a Psychiatric Disorder, 1996-2004

FIGURE 2.
Distributions of BPD Subtypes and Diagnostic Specifiers by Age Groups, 1996-2004

FIGURE 3.
 Demographic Trends in Number of U.S. Acute-Care Inpatient Discharges per 10,000 Children, Adolescents and Adults with a Principal Diagnosis of Bipolar

TABLE 1
Groups of Psychiatric Disorders Appearing as Primary Diagnoses for Acute-Care Inpatients from 1996 to 2004

	Children		Adolescents		Adults	
	% change 1996-2004	Linear Trend	% change 1996-2004	Linear Trend	% change 1996-2004	Linear Trend
Substance	0%	—	-4.3%	-.26	-10.1%	-.14
Depression	16.5%	.49	106.6%	.94	25.9%	.76
Bipolar	438.6%	.89	296.4%	.80	56.0%	.80
Anxiety	-20.8%	-.24	-1.7%	.20	-27.2%	-.62
Conduct	6.2%	-.23	12.0%	-.18	0%	—
Psychosis	0%	—	-0.8%	.12	7.2%	.65
Developmental	0%	—	-39.5%	-.02	0%	-.44
Cognitive	0%	—	0%	—	-29.5%	-.64
Psychophysiological	0%	—	161.3%	.31	-36.7%	-.03
Other	66.3%	.58	0%	—	-0.8%	-.44
Total	53.2%	.79	58.5%	.88	3.3%	.53

Change is the difference between 2004 rates per 10,000 minus 1996 rates divided by 1996's figure. Measure of linear trend is the Pearson correlation (*r*) between rate and calendar year, providing a gauge of consistency in the direction of change.

Significant *r* values, with $p < .01$, are in **bold**; $df=8$.

TABLE 2
Adjusted Odds Ratios that Hospital Discharge has Primary Diagnosis of Bipolar Disorder

Effect	Coding	Odds Ratio [99% Confidence Interval]		
		Children	Adolescents	Adults
Survey Year	1 unit per year (1996-2004)	1.31 [1.30 – 1.32]	1.06 [1.05 – 1.06]	1.06 [1.06 – 1.06]
Sex	1 = Male 0 = Female	1.94 [1.81 – 2.08]	0.77 [0.74 – 0.80]	0.61 [0.61 – 0.62]
Race	1 = Black 0 = White & Other	0.29 [0.26 – 0.33]	1.17 [1.09 – 1.26]	0.58 [0.57 – 0.59]
Payer for Care	1 = Government 0 = Commercial	0.45 [0.44 – 0.46]	0.91 [0.90 – 0.93]	0.91 [0.91 – 0.92]
Race × Sex	Adjusted odds difference for Black males	0.25 [0.21 – 0.29]	0.33 [0.29 – 0.37]	0.76 [0.74 – 0.78]
Sex × Year	Annual change in odds difference for males relative to females	0.93 [0.92 – 0.94]	1.03 [1.02 – 1.04]	1.01 [1.01 – 1.01]
Race × Year	Annual change in odds difference between Black White/ Other	0.99 [0.97 – 1.00]	0.92 [0.91 – 0.93]	1.02 [1.02 – 1.03]
Race × Sex × Year	Annual change in odds for Black males	1.19 [1.16 – 1.21]	1.26 [1.24 – 1.28]	1.03 [1.02 – 1.03]
Race × Payer	Odds difference for Black persons whose care is paid by government program.	3.10 [2.96 – 3.26]	0.78 [0.75 – 0.81]	0.89 [0.88 – 0.90]