ORIGINAL ARTICLE

National Trends in the Outpatient Treatment of Children and Adolescents With Antipsychotic Drugs

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Context: Although there are indications that antipsychotic drugs are increasingly used to treat children and adolescents, little is known about the characteristics of those who receive them.

Objective: To examine national trends and patterns in antipsychotic treatment of youth seen by physicians in office-based medical practice.

Design: Analysis of national trends of visits (1993-2002) that included prescription of antipsychotics, and comparison of the clinical and demographic characteristics of visits (2000-2002) that included or did not include antipsychotic treatment.

Setting: Outpatient visits to physicians in office-based practice.

Participants: Patient visits by persons 20 years and younger from the National Ambulatory Medical Care Surveys from 1993 to 2002.

Main Outcome Measures: Visits that included prescription of antipsychotics.

Results: In the United States, the estimated number of office-based visits by youth that included antipsychotic treatment increased from approximately 201 000 in 1993 to 1 224 000 in 2002. From 2000 to 2002, the number of visits that included antipsychotic treatment was significantly higher for male youth (1913 visits per 100 000 population) than for female youth (739 visits per 100 000 population), and for white non-Hispanic youth (1515 visits per 100 000 population) than for youth of other racial or ethnic groups (426 visits per 100 000 population). Overall, 9.2% of mental health visits and 18.3% of visits to psychiatrists included antipsychotic treatment. From 2000 to 2002, 92.3% of visits with prescription of an antipsychotic included a second-generation medication. Mental health visits with prescription of an antipsychotic included patients with diagnoses of disruptive behavior disorders (37.8%), mood disorders (31.8%), pervasive developmental disorders or mental retardation (17.3%), and psychotic disorders (14.2%).

Conclusions: There has been a sharp national increase in antipsychotic treatment among children and adolescents in office-based medical practice. Second-generation antipsychotics are being widely prescribed, and emerging empirical evidence provides a base of support that is limited to short-term safety and efficacy.

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STUDIES[1-3] OF PRIVATELY AND publicly insured populations indicate recent growth in the treatment of young people with antipsychotic drugs. In a large privately insured prescription database, for example, treatment of youth younger than 18 years with antipsychotic medications increased from 0.32% in 1997 to 0.50% in 2000.[1] In Texas, the number of child and adolescent Medicaid enrollees prescribed second-generation antipsychotic medications increased 494% between 1996 and 2000, and the number prescribed first-generation antipsychotic medications increased 160% during that period.[2] Similar increases in youth antipsychotic treatment have been reported among the Tennessee Medicaid population.[3]

Little is known about the clinical characteristics of youth who receive antipsychotic treatment. Analysis of commercial[4] and Medicaid[2] prescription claims reveals that antipsychotic treatment is significantly greater among boys than girls. According to Tennessee Medicaid claims, treatment of attention-deficit/hyperactivity disorder, conduct disorder, and mood disorders accounts for most of the increase in antipsychotic use.[3] In a study of youth in residential treatment, antipsychotic treatment was significantly related to delinquent behavior, substance abuse, sexually abusive behavior, and other behavioral problems.[5] In a large convenience sample of psychiatric outpatients, 77% of youth who received an antipsychotic medication did not have a diagnosis of a psychotic disorder.[6]

Second-generation antipsychotic medications comprise most of the antipsychotic medications prescribed to young people.[3,5] None of these medications are approved by the Food and Drug Administration for use in pediatric populations. The only antipsychotic medications with Food and Drug Administration indications for persons younger than 18 years are haloperidol (for Tourette disorder, treatment-resistant severe behavioral disorders, and treatment-resistant hyperactivity with conduct disorders), thioridazine hydrochloride (for severe behavioral problems and hyperactivity with conduct disorders), and pimozide (for Tourette disorder).

Recent increases in antipsychotic treatment of youth, coupled with concerns about metabolic risks associated with some second-generation antipsychotic medications, have contributed to public and professional unease about current treatment patterns. Without nationally representative data, it has been impossible to evaluate broad trends in antipsychotic treatment of children and adolescents. Herein, we examine national trends and patterns in the antipsychotic treatment of young people by physicians in office-based practice. We chart recent growth in the number of medical office visits by children and adolescents in the United States that include antipsychotic treatment.

METHODS

Data were drawn from the National Ambulatory Medical Care Survey (NAMCS).[7] The NAMCS, which is conducted annually by the National Center for Health Statistics, is a nationally representative sample of visits to non–federally employed physicians in office-based practice. The NAMCS uses a multistage probability design that involves probability samples of primary sampling units, physician practices within these units, and individual patient visits within these practices. Data collection is carried out by physicians, aided by their office staff when possible, as instructed by field data collection agents from the US Census Bureau.[8]

Following National Center for Health Statistics recommendations,[9] data from contiguous survey years were combined to derive more stable estimates. To arrive at more stable annual estimates for survey years with few annual visits, we grouped visits in the following periods: 1993 to 1995, 1996 to 1997, 1998, 1999, 2000, 2001, and 2002. Across the 10 survey years, response rates varied between 70% and 73%.

DIAGNOSIS

Diagnoses were made according to the *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)*. Visits were classified by a modification of a broad diagnostic scheme developed by Pottick and coworkers.[10] Specifically, visits were classified into the following 6 broad diagnostic categories: (1) psychotic disorders (*ICD-9-CM* codes 290.00-295.99, 296.24, 296.34, 297.00-298.09, 298.30-299.99 [except 299.00-299.19 and 299.80-299.89], and 310.00-310.99), (2) disruptive behavior disorders (*ICD-9-CM* codes 309.30-309.39, 312.00-312.49, 312.80-312.99, 313.81, and 314-314.99), (3) mood disorders (*ICD-9-CM* codes 296.82, 301.12, 313.10-313.19, 296.2-296.23, 296.25-296.33, 296.34-296.39, 296.90-296.99, 300.40-300.49, 301.10-301.19, 311.00-311.99, 296.00-296.19, 296.4-296.81, 296.89, 301.11, and 301.13), (4) tic disorders (*ICD-9-CM* codes 307.20-307.29), (5) pervasive developmental disorders or mental retardation (*ICD-9-CM* codes 299.00-299.19, 299.80-299.89, and 317.00-319.99), and (6) other mental disorders (*ICD-9-CM* codes 300.00-300.09, 300.20-300.39, 300.90-300.99, 307.00-307.99 [except 307.20-307.29], 308.00-308.99, 309.21, 309.81, 313.00-313.09, 313.20-313.29, and 315.00-315.99). Patients with visits associated with 2 or more diagnosed mental disorders (*ICD-9-CM* codes 290-319) were classified as having a comorbid mental disorder.

PSYCHOTROPIC MEDICATIONS

Visits in which psychotropic medications were monitored or provided were classified into the following 5 medication groups: antipsychotic medications (which are the primary focus of the analyses), stimulants, antidepressants, anxiolytics and hypnotics, and mood stabilizers. Antipsychotics were subclassified into second-generation agents (clozapine, risperidone, olanzapine, and quetiapine fumarate) and first-generation agents (all others). Anxiolytics and hypnotics included benzodiazepines and nonbenzodiazepine sedatives and anxiolytics. Mood stabilizers included lithium carbonate and lithium citrate and anticonvulsants prescribed to patients without a seizure disorder diagnosis.

HEALTH INSURANCE

Data were collapsed into the following 3 mutually exclusive and exhaustive health insurance categories: (1) private insurance, such as BlueCross BlueShield and other commercial insurance; (2) public insurance, including Medicare, Medicaid, and other government insurance; and (3) a residual category that combined patients with self-payment, no charge, workers' compensation, those whose source of insurance was unknown, and those who received uncompensated care. In visits with more than 1 source of payment, assignment was hierarchical, with visits assigned to private, public, and other insurance groups in descending order.

OTHER MEASURES

Visits were also classified on the basis of the patient's age (in years), sex, race or ethnicity (Hispanic or nonwhite vs other), visit duration or number of minutes of face-to-face contact with the physician, physician medical specialty (psychiatrist vs other), and provision of psychotherapy. Psychotherapy was defined as any treatment involving the intentional use of verbal techniques to explore or to alter the patient's emotional life to effect symptom reduction or behavior change.[8]

ANALYTIC STRATEGY

An analysis was conducted of trends and patterns in the office-based antipsychotic treatment of children and adolescents. For the trend analysis, population-based rates of office-based youth visits with antipsychotic treatment were determined for 1993 to 1995, 1996 to 1997, 1998, 1999, 2000, 2001, and 2002. Numerators were the weighted estimates from the NAMCS of the number of visits with antipsychotic treatment by youth aged to 0 to 20 years. Denominators were annual estimates from the US Census Bureau for the population aged 0 to 20 years.[11] For estimates of the combined years (1993-1995 and 1996-1997), the numerators were the sum of the weighted count of visits, and the denominators were the sum of the population aged 0 to 20 years. Change over time in the number of antipsychotic visits was assessed using a linear model with log [rate/(1–rate)] as the response variable and year as the predictor vari-

able. In addition to this trend analysis, the population-based rate of antipsychotic treatment visits for 2000 to 2002 was determined by patient sex, age group (0-13 vs 14-20 years), and race or ethnicity.

The pattern of antipsychotic treatment of children and adolescents was examined among mental health visits. A mental health visit was defined as a visit in which there was a diagnosis of a mental disorder (*ICD-9-CM* codes 290-319), treatment by a psychiatrist, or provision of psychotherapy. Among youth mental health visits, those that included antipsychotic treatment were compared with those that did not include antipsychotic treatment. Comparisons are presented with respect to age, sex, race or ethnicity, health insurance, visit duration, provision of psychotherapy, mental disorder diagnoses, mental disorder comorbidity, other psychotropic medications, and physician medical specialty.

STATISTICAL ANALYSIS

The National Center for Health Statistics weights each NAMCS visit to correct for sampling imperfections. Reported percentages are based on weighted estimates. χ^2 Statistics were used to test for differences in the distribution of categorical variables, and *t* tests were used to test for differences in the distribution of continuous variables. Results were considered significant at $\alpha = .05$ (2-tailed). Among youth mental health visits, logistic regression analysis was used to estimate the strength of independent associations of patient age, sex, race or ethnicity, health insurance, visit duration, provision of psychotherapy, mental disorder diagnoses, mental disorder comorbidity, other psychotropic medications, and physician medical specialty with antipsychotic treatment.

We used the SUDAAN statistical software package[12] to accommodate the complex sampling design and weights from the NAMCS when calculating means and corresponding standard errors and when calculating 95% confidence intervals for the rate estimates. Estimates based on fewer than 30 visits are considered unreliable[8] and are so labeled in the tables.

RESULTS

TRENDS IN CHILD AND ADOLESCENT VISITS THAT INCLUDE ANTIPSYCHOTIC TREATMENT

The number of office visits in the United States by individuals aged 0 to 20 years that included prescription of an antipsychotic medication increased from approximately 201 000 in 1993-1995 to 1 224 000 in 2002. The annual number of such visits per 100 000 population younger than 21 years increased from 274.7 in 1993 to 1995 to 1438.4 in 2002 (**Figure**). A linear model indicated a strong linear relationship in the number of visits that included antipsychotic treatment ($\beta = .24$, $t_5 = 9.5$, $P < .001$).

STRATIFIED NUMBER OF CHILD AND ADOLESCENT VISITS THAT INCLUDE ANTIPSYCHOTIC TREATMENT

Between 2000 and 2002, the estimated mean annual number of child and adolescent visits that included antipsychotic treatment was 1341 visits per 100 000 population (**Table 1**). The number of visits that included antipsychotic treatment per 100 000 population was significantly higher for male subjects than for female subjects, and for white non-Hispanic subjects than for subjects of other racial or ethnic groups. In separate analyses, a significant racial or ethnic difference in the number of visits per 100 000 population was also observed for child and adolescent mental health visits that did not include antipsychotic treatment as follows: white non-Hispanic youth: 13 763 (95% confidence interval, 11 408-16 118) visits per 100 000 population vs other youth: 4711 (95% confidence interval, 3568-5854) visits per 100 000 population and for all youth visits (white non-Hispanic youth: 200 184 [95% confidence interval, 178 516-221 852] visits per 100 000 population vs youth of other racial or ethnic groups: 127 066 [95% confidence interval, 106 169-147 963] visits per 100 000 population).

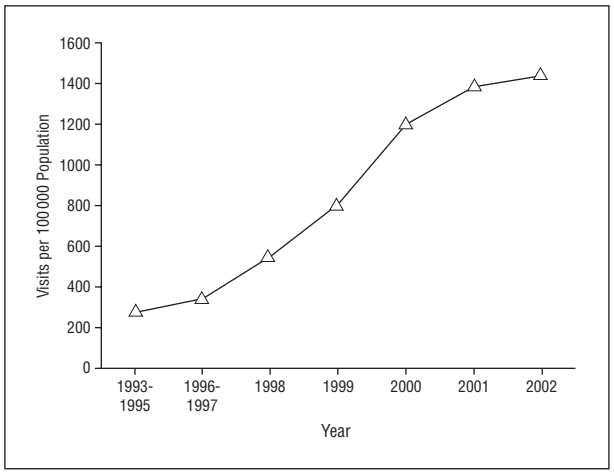

Figure. National trends in office-based visits by children and adolescents that included antipsychotic treatment, 1993-2002. Annualized visit rates per 100 000 population aged 0 to 20 years were calculated using National Ambulatory Medical Care Survey and US Census Bureau data.

Table 1. National Annualized Population Estimates of Office-Based Physician Visits by Children and Adolescents That Included Antipsychotic Treatment, 2000-2002*

Variable	Unweighted Cell Size	Weighted Visits per 100 000 Population (95% Confidence Interval)
Total	**181**	1341 (893-1788)
Sex		
Male	127	1913 (1166-2660)
Female	54	739 (429-1049)
Age group, y		
0-13	99	1067 (646-1488)
14-20	82	1884 (1123-2645)
Race or ethnicity†		
White non-Hispanic	126	1515 (859-2171)
Other	31	426 (210-643)

*Calculated using National Ambulatory Medical Care Survey and US Census Bureau data for persons aged 0 to 20 years with a mental health visit (mental disorder diagnosis, visit to a psychiatrist, or provision of psychotherapy).

†Race or ethnicity is missing for 24 of the 181 mental health visits with antipsychotic treatment.

Table 2. Demographic and Clinical Characteristics of Office-Based Physician Visits by Children and Adolescents, 2000-2002*

Characteristic	Visits With Antipsychotic Treatment (n = 173)	Visits Without Antipsychotic Treatment (n = 1251)	χ^2 Statistic	*P* Value
Female sex	47 (21.8)	500 (40.6)	9.9	<.001
White non-Hispanic race or ethnicity	120 (85.8)†	873 (82.0)‡	1.0	.32
Health insurance			10.1§	.01
Private	65 (35.9)	693 (59.3)		
Public	64 (38.1)	254 (20.4)		
Other	44 (26.0)	304 (20.3)		
Included psychotherapy	57 (38.8)	356 (25.4)	2.4	.12
Mental disorder diagnosis				
Psychotic disorder	27 (14.2)‖	27 (1.6)‖	8.5	<.001
Disruptive behavior disorder	70 (37.8)	647 (52.1)	3.0	.08
Mood disorder	48 (31.8)	255 (20.7)	3.4	.07
Tic disorder	9 (3.3)‖	25 (0.9)‖	2.1	.15
Pervasive developmental disorder or mental retardation	28 (17.3)‖	53 (3.7)	3.2	.08
Other mental disorder	68 (32.1)	387 (28.3)	0.8	.38
Mental disorder comorbidity present	86 (44.6)	343 (21.2)	9.6	<.001
Other psychotropic medications				
Stimulants	66 (44.2)	508 (39.9)	0.4	.55
Antidepressants	67 (33.7)	394 (27.9)	2.1	.15
Anxiolytics and hypnotics	18 (9.7)‖	70 (4.9)	2.9	.09
Mood stabilizers	63 (37.2)	106 (5.9)	12.0	<.001
Treatment by psychiatrist	161 (89.5)	724 (40.3)	27.5	<.001
Age, mean ± SE, y	12.8 ± 0.6	12.1 ± 0.2	1.4¶	.17
Visit duration, mean ± SE, min	27.0 ± 2.3	25.6 ± 0.9	0.7¶	.48

*Data are given as weighted visits (percentage) unless otherwise indicated and are calculated using National Ambulatory Medical Care Survey and US Census Bureau data for persons aged 0 to 20 years with a mental health visit (mental disorder diagnosis, visit to a psychiatrist, or provision of psychotherapy).
†Race or ethnicity is missing for 23 of 173 mental health visits with antipsychotic treatment.
‡Missing for 192 visits.
§2 *df*.
‖Unreliable estimate based on fewer than 30 visits.
¶*t* Test.

ANTIPSYCHOTIC TREATMENT VISITS

From 2000 to 2002, most office-based visits by children and adolescents with prescription of an antipsychotic medication included a mental disorder diagnosis (90.1%; 95% confidence interval, 77.5-96.0 cell size; n=168) or were provided by psychiatrists (83.5%; 95% confidence interval, 69.2-92.0; cell size n=161), but less often included psychotherapy (36.2%; 95% confidence interval, 21.0-54.7; cell size n=57). Overall, 93.4% (95% confidence interval 796-98.2, n=173) of visits that included antipsychotic treatment included one or more indications of mental health treatment. Second-generation antipsychotic medications were prescribed in 92.3% of the visits by youth from 2000 to 2002 that included antipsychotic treatment.

MENTAL HEALTH VISITS

Mental health visits were defined as visits in which there was a mental disorder diagnosis, treatment by a psychiatrist, or provision of psychotherapy. Approximately 9.2% of mental health visits by children and adolescents from 2000 to 2002 period included prescription of an antipsychotic medication. Mental health visits that included antipsychotic treatment did not significantly differ from those that did not include antipsychotic treatment with respect to patient age, race or ethnicity, visit duration, or provision of psychotherapy (**Table 2**). However, compared with youth mental health visits that did not include antipsychotic treatment, youth mental health visits that included antipsychotic treatment were significantly more likely to be made by male patients, patients with psychotic disorders, and patients diagnosed as having more than 1 mental disorder. These mental health visits were also significantly more likely than those that did not include antipsychotic treatment to be provided by a psychiatrist and to include treatment with a mood stabilizer. Among youth mental health visits that included prescription of an antipsychotic medication, disruptive behavior disorders (37.8%) and mood disorders (31.8%) tended to be more frequently diagnosed than pervasive developmental disorders or mental retardation (17.3%) or psychotic disorders (14.2%), although the last 2 estimates are unreliable as they are based on fewer than 30 visits.

In the logistic regression analysis, male sex, public health insurance (vs private health insurance), treatment by a psychiatrist, and diagnosis of psychotic disorder, pervasive developmental disorder or mental retardation, tic disorder, or mood disorder each significantly increased the likelihood of receiving antipsychotic treatment, adjusting for the other variables. **Table 3** summarizes these findings.

COMMENT

From 1993 to 2002, there was an approximate 6-fold national increase in the absolute number of office-based visits by children and adolescents that included prescription of antipsychotic medications. From 2000 to 2002, there were approximately 1341 office visits with antipsychotic treatment per 100 000 children and adolescents in the population. This marked increase followed a period of little growth in the use of antipsychotic medications by young people. From 1987 to 1996, the number of noninstitutionalized US children and adolescents 18 years and younger treated with antipsychotic medications remained constant at approximately 200 per 100 000,[13] although increases have been reported in the use of antipsychotic medications in 2 state Medicaid plans.[14] In a mid-Atlantic state, the number of Medicaid-enrolled youth younger than 20 years who received an antipsychotic medication increased from 450 per 100 000 population in 1991 to 800 per 100 000 population in 1996, and in a midwestern state, the number increased from 330 per 100 000 population in 1991 to 540 per 100 000 population in 1996.

Growth in youth antipsychotic treatment likely occurred in response to the availability of new antipsychotic medications with fewer short-term adverse effects in adults. Compared with first-generation antipsychotic medications, second-generation agents tend to have less sedation, fewer extrapyramidal and anticholinergic effects, and a lower long-term risk of tardive dyskinesias.[15] With declining access to and duration of inpatient psychiatric treatment of children and adolescents,[16,17] physicians may have been called on to treat a more severely ill group of children and adolescents as outpatients, which in turn contributed to an increased use of antipsychotic medications.

From 2000 to 2002, second-generation agents composed 92.3% of the antipsychotic medications prescribed in office-based practice to children and adolescents. With the increased use of second-generation antipsychotic medications, concern has arisen about the risks of weight gain, hyperlipidemia, and diabetes mellitus.[17,18] Adverse metabolic effects of some second-generation antipsychotic medications may be even more severe in children and adolescents than in adults.[19-23]

Consistent with previous studies of public[3] and commercially insured[4] youth, antipsychotic treatment was significantly more common in mental health visits by male patients than by female patients. Although this sex difference might be partially explained by the antipsychotic treatment of tic disorders, pervasive developmental disorders, or disruptive behavior disorders, all of which are more common in boys than girls,[24-28] mental health visits by male subjects remained significantly more likely to include antipsychotic treatment after controlling for these and other diagnoses. It is possible that sex differences in size, physical strength, and risk of damage or injury has contributed to the male predominance of antipsychotic treatment among young people.

On a per capita basis, white non-Hispanic youth made more than 3 times the number of visits that included antipsychotic treatment compared with youth of other racial or ethnic groups. White non-Hispanic youth were also significantly more likely than racial or ethnic minorities to have mental health visits or health care visits in general at office-based practices. Moreover, there were no significant racial or ethnic differences in the proportions of child and adolescent mental health visits that included prescription of an antipsychotic medication. Therefore, the lower population rate of antipsychotic treatment visits by children and adolescents of minority racial or ethnic ancestry appears to be more closely tied to a nonspecific tendency for these children and adolescents to be underserved in office-based settings rather than tied to racial/ethnic differences in the prescribing practices of office-based physicians.

Child and adolescent mental health visits that include antipsychotic treatment occur disproportionately among publicly rather than privately insured patients. After adjusting for patient diagnosis and other background characteristics, mental health visits by publicly insured children and adolescents were significantly more likely to include prescription of an antipsychotic medication. This finding is in line with higher youth antipsychotic prescription utilization among populations covered by Medicaid[2,3] compared with commercially insured populations.[4] The basis of this is unknown but may relate to differences in public and private payer reimbursement schedules for pharmacologic or psychological interventions, insurance-related variations in parent or child acceptance of antipsychotic treatment, or selection of patients in different insurance plans by physicians for treatment. Because Medicaid covers children and adoles-

Table 3. Predictors of Office-Based Physician Visits by Children and Adolescents That Included Antipsychotic Treatment, 2000-2002*

Predictor	Odds Ratio (95% Confidence Interval)	Logistic Regression Analysis†
Age	1.0 (0.9-1.0)	$t = -1.0$, $P = .33$
Male sex vs female	2.3 (1.5-3.7)	$t = 3.7$, $P < .001$
White non-Hispanic race or ethnicity vs other‡	1.7 (0.8-3.6)	$t = 1.5$, $P = .14$
Health insurance vs private		
Public	3.6 (1.6-8.1)	$t = 3.2$, $P < .001$
Other	1.1 (0.6-2.1)	$t = 0.3$, $P = .74$
Mental disorder diagnosis vs none		
Psychotic disorder	25.9 (7.9-85.1)	$t = 5.4$, $P < .001$
Disruptive behavior disorder	0.5 (0.3-1.0)	$t = -2.1$ $P = .03$
Mood disorder	2.9 (1.2-7.0)	$t = 2.4$, $P = .02$
Tic disorder	7.2 (1.9-28.1)	$t = 2.9$, $P < .001$
Pervasive developmental disorder or mental retardation	5.8 (2.4-13.9)	$t = 4.0$, $P < .001$
Other mental disorder	1.3 (0.7-2.5)	$t = 0.9$, $P = .38$
Mental disorder comorbidity present vs absent	1.1 (0.5-2.2)	$t = 0.2$, $P = .81$
Treatment by psychiatrist vs other	39.7 (17.4-91.0)	$t = 8.8$, $P < .001$

*Calculated using National Ambulatory Medical Care Survey and US Census Bureau data for persons aged 0 to 20 years with a mental health visit (mental disorder diagnosis, visit to a psychiatrist, or provision of psychotherapy).
†Based on 1209 visits. Intercept $t = -8.7$, $P < .001$. Overall model Wald $F_{14} = 41.9$, $P < .001$.
‡Missing for 215 visits.

cents with Social Security Income and young people who are medically needy or in foster care, illness severity may account for differences in antipsychotic medication use across insurance groups.[29] Additional study is needed to understand the factors that contribute to insurance-related differences in child and adolescent antipsychotic treatment.

Approximately one third of the child and adolescent visits with prescription of antipsychotic medications were by young people with mood disorders. In addition, approximately one third of antipsychotic visits included coprescription of an antidepressant medication and one third included coprescription of a mood stabilizer. At present, there is a dearth of empirical evidence to support these prescribing patterns. A small double-blind controlled trial reported that quetiapine in combination with divalproex sodium was more effective than divalproex alone for adolescent bipolar mania.[30] The results of an open-label trial further suggest that olanzapine may be useful in the treatment of youth with bipolar disorder,[31] and the findings of a medical record review suggest that risperidone may be of value.[32] To our knowledge, there are no published controlled trials of antipsychotic or antidepressant combinations for the treatment of mood disorders in youth. In office-based settings, physicians appear to be adapting practices to children and adolescents that have been established for adults.[33,34]

In office-based practice, almost all of the antipsychotic treatment among children and adolescents is provided by psychiatrists. Although the NAMCS data suggest that primary care physicians and other nonpsychiatrist physicians provide care in approximately half of the youth mental health visits, they seldom prescribe antipsychotic medications.[7] In the United Kingdom, there has been a recent increase in prescription of antipsychotic medications to patients of all ages by general practitioners.[35] It will be important to track whether pediatricians and other primary care physicians in the United States increase their prescription of antipsychotic medications to children and adolescents over time. In other areas of psychological medicine, primary care physicians have adopted prescribing practices of psychiatrists after a brief lag period.[36]

Second-generation antipsychotic medications may be effective for treatment of a variety of different child and adolescent mental disorders.[30,37-44] Double-blind randomized controlled studies have demonstrated the efficacy of risperidone in the short-term treatment of disruptive behavioral symptoms in children with autistic and other pervasive developmental disorders[37-39] and in children with disruptive behavior disorders and subaverage intelligence.[40,41] Results of controlled trials further suggest that risperidone is safe and effective for the short-term treatment of tics in children and adolescents with Tourette syndrome.[42,43] Clozapine has also been shown to be significantly more efficacious than haloperidol in the treatment of positive and negative psychotic symptoms of childhood-onset schizophrenia.[44] Such research provides an emerging empirical basis for the use of second-generation antipsychotic medications in the short-term treatment of children and adolescents outside of Food and Drug Administration–approved indications.

A tension exists between community practice patterns, the availability of rigorous efficacy data from controlled clinical trials, and a scarcity of empirically supported alternative treatments for these disorders. Carefully controlled research is needed to determine the clinical conditions for which second-generation antipsychotic medications are safe and effective. In the meantime, efforts are being made to improve the quality of antipsychotic medication prescribing practices based on available clinical evidence and expert consensus.[45]

The present analyses have some important limitations. First, diagnoses in the NAMCS are based on the independent judgment of the prescribing physician rather than on research diagnostic interviews. Second, information is unavailable concerning dosages and duration of prescribed antipsychotic and other psychotropic medications. Third, physician nonresponse, missing ethnicity data, and other selection factors may have biased the observed pattern of antipsychotic prescribing. Fourth, the NAMCS samples visits rather than patients, and an unknown amount of patient duplication occurs during the sampling frame. Fifth, sample size limitations constrain efforts to evaluate the independence of associations between patient characteristics and provision of antipsychotic treatment. Sixth, the sample is restricted to office-based visits and does not capture visits to community mental health centers, outpatient clinics, and various other clinical settings where young people receive mental health care. As a result, the national number of visits in the current report that included antipsychotic treatment likely underestimates the total outpatient antipsychotic treatment of young people.

In recent years, second-generation antipsychotic medications have become common in the office-based mental health treatment of young people. These medications are used to treat children and adolescents with different mental disorders. Results of clinical trials provide a limited base of support for the short-term safety and efficacy of some second-generation antipsychotic medications for psychosis and disruptive behavior disorders. In light of the widespread and growing use of these medications, there is a pressing need to increase and extend the experimental evaluation of these medications in children and adolescents.

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