Original Investigation

National Trends in the Mental Health Care of Children, Adolescents, and Adults by Office-Based Physicians

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IMPORTANCE Despite evidence of the increasing use of psychotropic medications, little is known about the broader changes in the delivery of outpatient mental health treatment to children, adolescents, and adults.

OBJECTIVE To assess national trends and patterns in the mental health care of children, adolescents, and adults in office-based medical practice.

DESIGN, SETTING, AND PARTICIPANTS Outpatient visits to physicians in office-based practice from the 1995-2010 National Ambulatory Medical Care Surveys (N = 446 542). Trends (1995-2010) in visits with mental health care indicators are first compared between youths (<21 years) and adults (≥21 years) and then between children (0-13 years) and adolescents (14-20 years). Background and clinical characteristics of recent visits (2007-2010) resulting in a mental disorder diagnosis are also compared among children, adolescents, and adults.

MAIN OUTCOMES AND MEASURES Visits resulting in mental disorder diagnoses, prescription of psychotropic medications, provision of psychotherapy, or psychiatrist care.

RESULTS Between 1995-1998 and 2007-2010, visits resulting in mental disorder diagnoses per 100 population increased significantly faster for youths (from 7.78 to 15.30 visits) than for adults (from 23.23 to 28.48 visits) (interaction: $P < .001$). Psychiatrist visits also increased significantly faster for youths (from 2.86 to 5.71 visits) than for adults (from 10.22 to 10.87 visits) (interaction: $P < .001$). Psychotropic medication visits increased at comparable rates for youths (from 8.35 to 17.12 visits) and adults (from 30.76 to 65.90 visits) (interaction: $P = .13$). While psychotherapy visits increased from 2.25 to 3.17 per 100 population for youths, they decreased from 8.37 to 6.36 for adults (interaction: $P < .001$). In 2007-2010, 27.4% of child visits, 47.9% of adolescent visits, and 36.6% of adult visits resulting in a mental disorder diagnosis were to a psychiatrist.

CONCLUSIONS AND RELEVANCE Compared with adult mental health care, the mental health care of young people has increased more rapidly and has coincided with increased psychotropic medication use. A great majority of mental health care in office-based medical practice to children, adolescents, and adults is provided by nonpsychiatrist physicians calling for increased consultation and communication between specialties.

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Over the last several years, a number of important changes have occurred in the mental health care of children and adolescents in the United States.[1-3] Perhaps most importantly, there has been an increased clinical emphasis on pharmacological management.[4] This emphasis has been supported by large randomized controlled trials of stimulants for attention-deficit/hyperactivity disorder (ADHD),[5] antipsychotics for bipolar mania[6] and behavioral problems associated with autism,[7] and antidepressants for major depressive disorder[8] and several anxiety disorders.[9] Advances in pharmacological management, alongside development of evidence-based psychotherapies for common child and adolescent psychiatric disorders,[10] have been incorporated into disorder-specific clinical practice guidelines.[11-14]

Changes in the delivery of outpatient mental health care to young people are taking place in the context of a modest increase in the number of individuals of all ages who are receiving outpatient mental health care in the United States. The number of individuals receiving outpatient mental health treatment increased from 16.1 million in 1998 to 23.3 million in 2007.[15] During this period, there has been increased public acceptance concerning the appropriateness of treating major psychiatric disorders with prescription medications.[16]

Some trends in child and adolescent mental health care are readily understood as reactions to discrete events in the practice environment. Following the US Food and Drug Administration's safety warnings for antidepressants in 2004, for example, there was a slowdown in the overall growth of antidepressant use by young people,[17] a decrease in the number of individuals receiving antidepressants for depression,[18] and a compensatory increase in the number of children and adolescents receiving psychotherapy for depression.[19] Increasing awareness of the adverse metabolic effects of second-generation antipsychotic medications[20] is widely thought to have recently slowed the growth in the use of antipsychotic treatment among young people.[1,21] Other changes, such as an increase in the number of children who received a diagnosis of ADHD[3] or autism spectrum disorder,[22] are somewhat more difficult to pin on specific events or changes in the practice environment.

Our current understanding of national trends in child and adolescent outpatient mental health care largely derives from analyses of individual classes of psychotropic medications[1,2,23] and diagnostic groups.[3,24] In an effort to provide a more unified overview of recent changes in the delivery of outpatient child and adolescent mental health care, we present data from nationally representative surveys of office-based medical visits of broad trends and patterns of mental health care for children and adolescents in relation to adults. We focus on office-based medical visits resulting in clinical diagnoses of mental disorders, treatment by psychiatrists, prescription of psychotropic medications, and provision of psychotherapy, and we contrast the trends seen in children and adolescents with the those seen in youths and adults.

Methods

Data were obtained from the National Ambulatory Medical Care Survey.[25] This survey, which is conducted annually by the National Center for Health Statistics, samples a nationally representative group of visits to physicians in office-based practice. Following the recommendations of the National Center for Health Statistics, we combined data from contiguous survey years (1995-1998, 1999-2002, 2003-2006, and 2007-2010) to derive more stable estimates. Across the 16 survey years, response rates varied between 58.3% (2010) and 72.8% (1995), with a mean rate of 65.7%. For each visit, the treating physician or member of the physician's staff provided information about the patient's sociodemographic and clinical characteristics, as well as the medications prescribed or supplied to the patient.

Demographic Characteristics

On the basis of patient age, visits were first grouped into adult (≥21 years) and youth (<21 years) visits and then subgrouped into child (0-13 years) and adolescent (14-20 years) visits. In some analyses, visits were also grouped by sex (male and female) and race/ethnicity (non-Hispanic white, non-Hispanic black, and Hispanic).

Indicators of Mental Health Care

The 4 general indicators of mental health care included clinical mental disorder diagnosis, psychotropic medication prescription, psychotherapy provision, and psychiatric care. Visits with these indicators are correspondingly referred to as mental disorder visits, psychotropic medication visits, psychotherapy visits, and psychiatrist visits.

Diagnoses were made according to the *International Classification of Diseases, Ninth Revision, Clinical Modification* (*ICD-9-CM*). Visits were grouped by the presence of a mental disorder (*ICD-9-CM* codes 290-319), disruptive behavior disorder (*ICD-9-CM* code 309.3, 312.0-312.4, 312.8-312.9, 313.81, or 314), mood disorder (*ICD-9-CM* code 293.83, 296, 298.0, 300.4, 301.1, 311, or 313.1), anxiety disorder (*ICD-9-CM* code 293.84, 300.0, 300.2, 300.3, 308.3, 309.21, or 309.81), psychoses/developmental disorder (*ICD-9-CM* codes 290.0-295.9, 297.0-298.0, 298.3-299.9, 310.0-310.9, or 317-319), and other mental disorders (*ICD-9-CM* codes 290-319, not included in abovementioned codes). Preliminary analyses revealed that the number of visits resulting in psychotic disorder and developmental disorder diagnoses were too small to be considered as separate categories. In some analyses, mood disorder visits were further subgrouped by the presence of a depressive disorder diagnosis (*ICD-9-CM* code 296.2, 296.3, 296.82, 311, 300.4, or 298.0) or a bipolar disorder diagnosis (*ICD-9-CM* code 296.0, 296.1, 296.4, 296.5, 296.6, 296.7, 296.80, 296.81, 296.89, or 301.13). A comorbid mental disorder diagnosis variable indexed the presence of 2 or 3 diagnostic groups (mood, anxiety, disruptive behavior, psychoses/developmental, or other) within a single visit.

Visits in which psychotropic medications were either supplied or prescribed were classified into 5 medication groups:

Table 1. Trends in Office-Based Visits Resulting in Mental Disorder Diagnoses, Psychotropic Medications, Psychotherapy, and Psychiatric Care for Young People and Adults in the United States, 1995-2010[a]

Characteristic	No. of Visits per 100 Population (95% CI)				OR (95% CI)	*P* Value for Interaction
	1995-1998	1999-2002	2003-2006	2007-2010		
Any mental disorder diagnosis						
Youths	7.78 (6.51-9.06)	12.38 (10.05-14.72)	15.37 (12.50-18.24)	15.30 (12.09-18.51)	1.90 (1.55-2.33)	<.001
Adults	23.23 (20.62-25.84)	24.61 (21.10-28.12)	27.27 (23.13-31.40)	28.48 (23.95-33.01)	1.07 (0.94-1.21)	
Any psychotropic medication						
Youths	8.35 (7.11-9.58)	11.96 (9.75-14.17)	14.49 (11.80-17.18)	17.12 (13.59-20.66)	2.08 (1.70-2.54)	.13
Adults	30.76 (27.24-34.28)	38.07 (32.42-43.72)	49.29 (41.30-57.28)	65.90 (54.57-77.22)	2.45 (2.21-2.72)	
Psychotherapy						
Youths	2.25 (1.65-2.84)	3.47 (2.43-4.51)	4.21 (3.10-5.33)	3.17 (2.23-4.12)	1.24 (0.87-1.77)	<.001
Adults	8.37 (7.25-9.48)	7.95 (6.57-9.32)	7.71 (6.51-8.90)	6.36 (5.15-7.57)	0.57 (0.44-0.75)	
Visit to psychiatrist						
Youths	2.86 (2.11-3.60)	5.69 (4.14-7.23)	6.53 (4.92-8.14)	5.71 (4.01-7.41)	1.70 (1.19-2.43)	<.001
Adults	10.22 (8.59-11.85)	10.20 (8.60-11.81)	10.88 (9.04-12.72)	10.87 (8.95-12.78)	0.85 (0.66-1.09)	

Abbreviation: OR, odds ratio.

[a] Data are from the National Ambulatory Medical Care Survey. Youth are younger than 21 years of age, and adults are 21 years of age or older.

antipsychotic medications; stimulants and other medications to treat ADHD (atomoxetine hydrochloride, guanfacine hydrochloride, and clonidine hydrochloride); antidepressants; anxiolytics, which also included hypnotics; and mood stabilizers. Antipsychotics included first- and second-generation drugs. Anxiolytics included benzodiazepines and nonbenzodiazepine sedatives and anxiolytics. Mood stabilizers included lithium carbonate, carbamazepine, divalproex sodium-valproate sodium-valproic acid, and lamotrigine. All antidepressants (including duloxetine hydrochloride and trazodone hydrochloride, which are also used for nonmental health indications) were included as antidepressants. Burpopion hydrochloride, although also approved for treatment of ADHD for individuals 6 years of age or older, was also considered as an antidepressant.

Separate variables indexed whether the treating physician was a psychiatrist (including a child and adolescent psychiatrist or an adult psychiatrist compared with a nonpsychiatrist physician, including pediatricians and other nonpsychiatrist physicians). We also examined whether psychotherapy was provided by the physician at the visit and, for cross-sectional analyses, whether the nonpsychiatrist physician specialized in pediatrics, general practice, family medicine, internal medicine, or another medical specialty.

Source of Payment

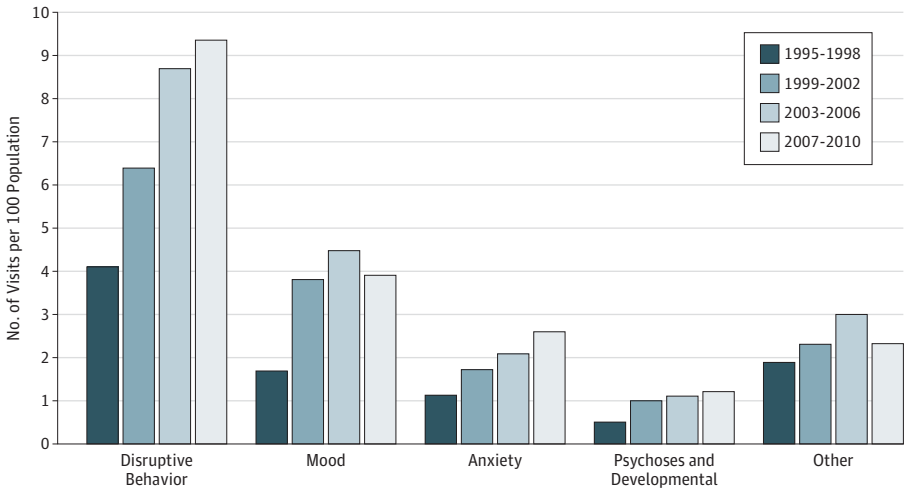
Data were collapsed into 4 mutually exclusive categories of primary source of payment: (1) private insurance, such as Blue Cross/Blue Shield and other commercial insurance; (2) Medicare; (3) Medicaid and other government insurance; and (4) a residual category ("self-pay/other") that combined patients with self-payment, no charge, workers compensation, those whose source of insurance was unknown, and those who received uncompensated care. For visits with more than 1 source of payment, assignment was hierarchical, with visits assigned to private, Medicare, Medicaid, and self-pay/other insurance groups in descending order.

Analytic Strategy

Population-based proportions and associated 95% CIs of office-based adult (≥21 years) and youth (<21 years) visits with each of the 4 general mental health care indicators were determined for years 1995-1998, 1999-2002, 2003-2006, and 2007-2010. Denominators were derived from intercensal estimates from the US Bureau of the Census[26] of the corresponding age groups (**Table 1**). Similar population-based proportions were determined for youths by mental disorder group (**Figure 1**) and psychotropic medication class (**Figure 2**). For each mental disorder group and psychotropic medication class, population-based proportions were derived separately for children (0-13 years) and adolescents (14-20 years) (eTable 1 in Supplement). Population-based proportions were then compared over time between youth visits to psychiatrists and nonpsychiatrist physicians by mental disorder group and psychotropic medication class (eTable 2 in Supplement). Finally, the percentage of visits resulting in a mental disorder diagnosis in 2007-2010 for children, adolescents, and adults were compared with respect to the demographic and clinical variables (**Table 2**).

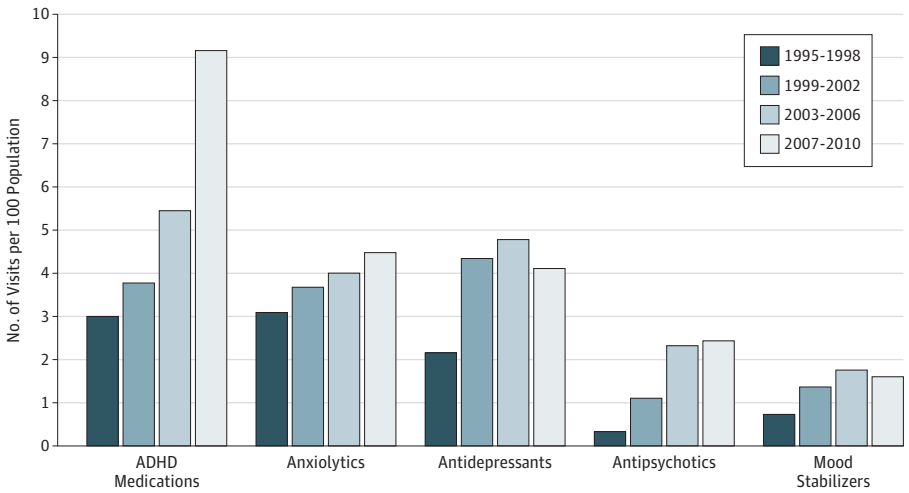
Logistic regression models were used to assess time trends in the probability of visits with the 4 general mental health care indicators and the specific mental disorder diagnosis groups and psychotropic medication classes. A study period variable was defined for each survey year running from 0 for 1995 to 1 for 2010. The outcome of interest was the odds of the mental health care indicator occurring

Figure 1. Trends in Office-Based Medical Visits by Young People With Mental Disorder Diagnoses, 1995-2010



Analysis was limited to young people (≤20 years). The odds ratios (ORs) and 95% CIs for the study period are for disruptive behavior disorders (OR, 2.31 [95% CI, 1.78-2.99]), mood disorders (OR, 1.92 [95% CI, 1.40-2.64]), anxiety disorders (OR, 2.72 [95% CI, 1.71-4.32]), psychoses and developmental disorders (OR, 2.27 [95% CI, 1.44-3.59]), and other mental disorders (OR, 1.17 [95% CI, 0.87-1.57]). Data are from the National Ambulatory Medical Care Survey.

Figure 2. Trends in Office-Based Medical Visits by Young People With Psychotropic Medications, 1995-2010



The attention-deficit/hyperactivity disorder (ADHD) medications include stimulants, atomoxetine hydrochloride, guanfacine hydrochloride, and clonidine hydrochloride. The odds ratios (ORs) and 95% CIs for the study period are for ADHD mediations (OR, 4.13 [95% CI, 3.04-5.61]), anxioytics (OR, 1.28 [95% CI, 0.91-1.79]), antidepressants (OR, 1.60 [95% CI, 1.21-2.11]), antipsychotics (OR, 6.01 [95% CI, 3.90-9.26]), and mood stabilizers (OR, 1.92 [95% CI, 1.29-2.84]). Data are from the National Ambulatory Medical Care Survey.

across the entire period (1995-2010). For example, an odds ratio of 2.0 for any mental disorder diagnosis denotes twice the odds of a visit resulting in a mental disorder diagnosis at the end (2010), compared with the start (1995), of the study period. Separate regressions were constructed for each level of visit characteristic of interest. An interaction term was added to many of the regressions to assess whether trends in the mental health indicators significantly differed across the groups. The *P* values associated with these interaction terms are presented in Tables 1 and 2 and eTable 2 in Supplement. For years 2007-2010, the difference in proportion test was used to compare the background and clinical characteristics of visits resulting in mental disorder diagnoses for children, adolescents, and adults. Analysis of variance was used to compare visit durations across the 3 age groups.

Supplemental analyses examine the distribution of child, adolescent, and adult visits resulting in mental disorder diagnoses (2007-2010) by geographic region, metropolitan area status, and visit disposition (eTable 3 in Supplement). They also assess trends in 4 mental health service indicators in young people by sex and racial/ethnic group (eTable 4 in Supplement) and mental health reasons for the visit (eTable 5 in Supplement). These reasons included anxiety and nervousness, fears and phobia, depression, anger, restlessness, and behavioral disturbances.

Analyses were adjusted for visit weights, clustering, and stratification of data using design elements provided by the National Center for Health Statistics. When adjusted for these elements, survey data represent annual visits to US office-based physicians.[25] Analyses were conducted using SUDAAN software (RTI International); all analyses were 2-sided, and the α level was set at .05. Population-based estimates without overlapping confidence intervals are considered to be significantly different from one another.

Table 2. Demographic and Clinical Characteristics of Children, Adolescents, and Adults Who Made Office-Based Physician Visits Resulting in a Mental Disorder Diagnosis, 2007-2010[a]

Characteristic	% of Visits Resulting in Mental Disorder Diagnosis			χ^2 Statistic	*P* Value	Group Differences
	1. Children (n = 1166)	2. Adolescents (n = 892)	3. Adults (n = 9264)			
Sex						
Male	69.02	55.93	37.62	27.81	<.001	1 > 2 > 3
Female	30.98	44.07	62.38			1 < 2 < 3
Race/ethnicity						
Non-Hispanic white[b]	71.77	82.13	84.53	5.66	<.002	1 < 2, 1 < 3
Non-Hispanic black	12.86	9.10	7.83			1 > 3
Hispanic	15.36	8.77	7.63			1 > 2, 1 > 3
Primary source of payment						
Private insurance	50.78	57.34	56.91	16.00	<.001	1 < 2, 1 < 3
Medicare	1.36	1.81	16.33			1 < 3, 2 < 3
Medicaid	37.30	23.12	10.29			1 > 2 > 3
Self-pay/other	10.55	17.73	16.47			1 < 2, 1 < 3
Mental disorders						
Disruptive behavior disorders	72.42	44.76	6.40	36.49	<.001	1 > 2 > 3
Mood disorders	11.68	44.68	53.63	40.51	<.001	1 < 2 < 3
Depression	5.85	29.46	42.37	37.96	<.001	1 < 2 < 3
Bipolar disorder	2.44	9.53	10.07	29.78	<.001	1 < 2, 1 < 3
Anxiety disorders	11.56	23.95	29.79	24.66	<.001	1 < 2 < 3
Psychoses/developmental disorders	8.80	6.36	11.22	7.02	<.001	2 < 3
Other mental disorders	16.12	14.22	18.66	2.95	.052	2 < 3
Comorbid mental disorders	19.18	30.46	17.75	11.06	<.001	1 < 2, 3 < 2
Psychotropic medications						
Any	64.52	71.43	71.21	4.29	.01	1 < 2, 1 < 3
ADHD medications[c]	55.76	36.70	7.69	30.40	<.001	1 > 2 > 3
Antipsychotics	11.06	18.30	15.04	6.32	.002	1 < 2, 1 < 3
Antidepressants	10.26	32.30	46.43	40.92	<.001	1 < 2 < 3
Anxiolytics	2.21	8.95	34.09	43.40	<.001	1 < 2 < 3
Mood stabilizers	4.29	9.85	8.24	10.83	<.001	1 < 2, 1 < 3
Medical specialty						
Psychiatrist	27.42	47.89	36.26	13.47	<.001	1 < 3 < 2
Adult psychiatry	23.84	43.74	35.39	15.12	<.001	1 < 3 < 2
Child psychiatry	3.58	4.14	0.87	2.05	.13	1 > 3, 2 > 3
Nonpsychiatrist physicians	72.58	52.11	63.74	13.47	<.001	2 < 3 < 1
Pediatrics	53.28	23.22	0.51	41.65	<.001	1 > 2 > 3
Family medicine/general practice	14.41	23.11	32.16	17.60	<.001	1 < 2 < 3
Internal medicine	0.54	2.09	19.50	33.13	<.001	1 < 3, 2 < 3
Other specialties	4.35	3.69	11.56	15.31	<.001	1 < 3, 2 < 3
Psychotherapy	14.28	26.92	20.89	10.91	<.001	1 < 3 < 2
Duration of visit, mean (SE), min	24.82 (0.76)	26.71 (0.95)	24.75 (0.45)	2.80[d]	.07	1 < 2, 3 < 2

Abbreviation: ADHD, attention-deficit/hyperactivity disorder.

[a] Data are from the National Ambulatory Medical Care Survey. Children range in age from 0 to 13 years, and adolescents range in age from 14 to 20 years.

[b] Includes whites, native Hawaiians or other Pacific Islanders, American Indians, and Alaskan natives.

[c] Include stimulants, atomoxetine hydrochloride, guanfacine hydrochloride, and clonidine hydrochloride.

[d] *F* statistic.

Results

Youth and Adult Mental Health Care

On a per capita basis, all 4 general indicators of office-based mental health care (mental disorder diagnosis, psychotropic medication prescription, psychotherapy provision, and visits to a psychiatrist) were significantly less prevalent among youths than adults. The number of visits including a psychotropic medication prescription significantly increased in both age groups. By contrast, the number of visits resulting in a mental disorder diagnosis and the number of visits to a psychiatrist nearly doubled for youths but did not significantly change for adults. The number of psychotherapy visits decreased for adults but remained little changed for youths (Table 1).

In supplemental analyses of reasons for visits, there was a significant increase in the population rate of visits by young people for anxiety and nervousness and a decrease in the num-

ber of visits for restlessness. Among adults, there were significant decreases in the number of visits for depression, anger, and restlessness (eTable 5 in Supplement).

Mental Health Care of Young People

Throughout the study period, disruptive behavior disorders were the most common mental disorder diagnosis among youths (Figure 1). A significant increase occurred in per capita youth visits resulting in diagnoses of disruptive behavior disorder, mood disorder, anxiety disorder, and psychoses/developmental disorder. Visits per 100 population of young people that included 2 or more mental disorder diagnoses increased from 1.34 (95% CI, 0.95-1.73) in 1995-1998 to 2.47 (95% CI, 1.80-3.15) in 1999-2002 to 3.46 (95% CI, 2.63-4.28) in 2003-2006 to 3.66 (95% CI, 2.66-4.65) in 2007-2010 (odds ratio, 2.60 [95% CI, 1.78-3.79]) (data not shown).

Significant increases were evident among youth visits with prescriptions for stimulants and other medications to treat ADHD, for antidepressants, for antipsychotics, and for mood stabilizers (Figure 2). By 2007-2010, stimulants and other medications to treat ADHD were the most commonly prescribed class of psychotropic medications for youths.

Mental Health Care of Children and Adolescents

Population rates of visits with mental disorder diagnoses and psychotropic medication prescriptions significantly increased for children and adolescents during the study period. Visits resulting in a diagnosis of psychotic or developmental disorder increased significantly faster among children than among adolescents, to the point where the 2 age groups had similar population-based visit rates by 2007-2010. By contrast, visits resulting in diagnoses of disruptive behavior disorders and visits resulting in prescriptions for stimulants and other medications to treat ADHD increased significantly more rapidly among adolescents than among children. By 2007-2010, children and adolescents had similar population rates of visits in which these medications were prescribed (eTable 1 in Supplement). In a post hoc analysis, stimulants accounted for 91.26% of child visits and 89.24% of adolescent visits in which medications to treat ADHD were prescribed in 2007-2010.

Mental Health Care of Young People by Psychiatrists and Nonpsychiatrist Physicians

Among youths, the rate of visits resulting in mental disorder diagnoses increased significantly more quickly for nonpsychiatrist physicians than for psychiatrists. Significantly faster growth in nonpsychiatrist than psychiatrist visits occurred for disruptive behavior disorders, mood disorders, and the residual group of mental disorders. The rate of youth psychotropic medication visits significantly increased for both provider groups but differed by psychotropic drug class. Antidepressant and antipsychotic visits increased significantly faster for nonpsychiatrist physicians than for psychiatrists, but the reverse was true of anxiolytic visits. In 2007-2010, nonpsychiatrist physicians provided significantly more overall psychotropic medication visits than psychiatrists, including significantly more visits resulting in prescriptions for anxiolytics, and stimulants and other medications to treat ADHD (eTable 2 in Supplement).

Characteristics of Child, Adolescent, and Adult Mental Disorder Visits

In 2007-2010, several differences were apparent in the demographic and clinical characteristics of mental disorder visits by children, adolescents, and adults. Compared with adult and adolescent mental disorder visits, child mental disorder visits included the largest percentage of male patients, Hispanic or non-Hispanic black patients, and Medicaid patients. From child to adolescent to adult mental disorder visits, there was an increase in the proportion of mood and anxiety disorder diagnoses and in antidepressant and anxiolytic prescriptions. Psychiatrists provided a smaller percentage of mental disorder visits to children than to either adolescents or adults (Table 2). Psychotherapy, which was provided in a minority of mental disorder visits to each age group, was least prevalent among child mental disorder visits.

In post hoc analyses (2007-2010), we found that 86.6% of child, 88.7% of adolescent, and 91.2% of adult mental disorder visits that included psychotherapy were to a psychiatrist. Among mental disorder visits that included a psychotropic medication prescription (2007-2010), 25.4% of child, 24.9% of adolescent, and 24.6% of adult visits included new prescriptions. Among mental disorder visits resulting in new psychotropic prescriptions, 72.8% of child, 64.1% of adolescent, and 75.9% of adult visits were to nonpsychiatrist physicians.

Discussion

In contrast to adults who underwent little change in the number of mental disorder visits on a population basis, children and adolescents had an increasing number of visits in which mental disorders were a focus of treatment. This increase was largely driven by a marked expansion in mental health visits to pediatricians and other nonpsychiatrist physicians by young people. The importance of these trends is underscored by the substantial role played by office-based medical practices in US health care; most pediatricians (68.8%), psychiatrists (64.8%), and adolescent psychiatrists (71.8%) work in office-based settings.[27]

The increase in office-based medical visits by youths with mental disorder diagnoses was broad based and extended to disruptive behavior disorders, mood disorders, anxiety disorders, and psychoses and developmental disorders. Because only about one-half of children and adolescents with severe mental disorders[28,29] receive treatment for their symptoms, the growth in the volume of office-based mental health visits by young people suggests that progress has been made in reducing the large number of young people with untreated psychiatric disorders.

Psychiatrists and nonpsychiatrist physicians serve separate but overlapping functions in the delivery of office-based mental health care to young people. During the study period, pediatricians and other nonpsychiatrist physicians became more involved in treating not just ADHD and other disruptive

behavior disorders, but also anxiety, mood, and even developmental and psychotic disorders. These evolving practice patterns likely reflect a regional lack of psychiatrists who can treat children and adolescents,[30] changes in mental health treatment-seeking patterns, new mental health financing arrangements, and shifting professional roles. Because most pediatricians believe that it is their responsibility to identify and refer rather than treat child and adolescent mental disorders other than ADHD,[31,32] their increasing treatment of a far wider range of mental disorders underscores the need to strengthen the lines of communication between primary care physicians and psychiatrists.[33] In response to these pressures, some states have developed programs that provide pediatricians with access to training and telephone consultations from child and adolescent psychiatrists and other mental health specialists at neighboring academic centers.[34] The rapid growth of these programs[35] represents a rational policy response to the sharp increase in demand for outpatient child mental health care in office-based medical practice.

An impressive increase occurred in the number of psychotropic medication visits by children and adolescents. The number of visits resulting in prescriptions for stimulants and other medications to treat ADHD grew very rapidly for adolescents. By 2007-2010, the population-based rate of visits resulting in prescriptions for stimulants and other medications to treat ADHD was comparable for children and adolescents. The increasing number of children and adolescents being prescribed stimulants and other medications for the treatment of ADHD may be related to the maturation of ADHD treatment advocacy campaigns,[36] the dissemination of practice guidelines for ADHD,[37] and a steady stream of new medications and formulations approved by the US Food and Drug Administration to treat ADHD in young people.

The growth in the number of stimulant prescriptions to adolescents raises potential safety concerns. These include adverse psychiatric events,[38] risks associated with combining stimulants with alcohol and other sedatives,[39] and the potential for stimulant abuse.[40] Yet such safety considerations should be balanced against the known efficacy of stimulants in treating ADHD[11] and the evidence of undertreatment. A nationally representative survey conducted in 2002-2004 reported that 40.2% of adolescents with ADHD had never received mental health services for their symptoms[29] and that only 20.4% had received stimulant medication in the last year.[41]

Antipsychotics were the fastest growing class of psychotropic medications among young people. Although psychiatrists continue to account for most office-based antipsychotic visits among young people, the number of antipsychotic prescriptions made by nonpsychiatrist physicians grew very rapidly during the study period. Concern exists that much of the growth in antipsychotic treatment of children and adolescents is the result of treating disruptive behavior disorders[42] and that antipsychotics are not generally considered a first-line treatment for these conditions[43,44] owing to safety concerns.[45] As pediatricians, family practitioners, and general practitioners assume a more prominent role in prescribing antipsychotics to children and adolescents, more consultations with psychiatrists and other mental health specialists will be needed to ensure appropriate diagnostic assessments together with appropriate symptom and adverse event monitoring.[46]

The survey data do not offer insight into the determinants or clinical consequences of the disproportionate increase in antipsychotic and antidepressant treatment of young people by nonpsychiatrist physicians. Detailed practice-based services research is needed to compare nonpsychiatrist physicians and psychiatrists with respect to patient selection for these medications, their use in relation to psychosocial treatments, and duration of treatment. Beyond characterizing psychotropic treatment patterns, a comparative effectiveness research agenda is needed to compare outcomes of mental health care provided by generalists and mental health specialists to inform evidence-based guidelines for when it is appropriate for generalists to treat, as opposed to diagnose and refer, their patients with psychiatric disorders.[47]

The number of visits resulting in antidepressant prescriptions to young people also significantly increased. This increase was particularly evident among visits to nonpsychiatrist physicians. The number of antidepressant prescriptions to young people by nonpsychiatrist physicians increased between 1995-1998 and 2003-2006 before decreasing in 2007-2010, a pattern that may reflect greater reluctance to prescribe antidepressants following the black box warning in October 2004. During the study period, treatment guidelines were published that endorsed antidepressant treatment of adolescent depression[14] and some anxiety disorders.[13] In addition, several antidepressants received the approval of the US Food and Drug Administration for the treatment of depression (fluoxetine hydrochloride in 2003 and escitalopram oxalate in 2009), panic disorder (sertraline hydrochloride in 1997), and obsessive-compulsive disorder (fluvoxamine maleate in 1997, sertraline hydrochloride in 2002, and fluoxetine hydrochloride in 2003) among youths.

Beyond specific factors, some general considerations may have further fueled the increased number of psychotropic visits among children and adolescents. During the study period, individuals in the United States became more willing to take psychotropic medications for different conditions, including relatively minor concerns such as coping with the stresses of life.[48] The US Food and Drug Administration Modernization Act (1997) encouraged pharmaceutical manufacturers to study their approved drugs in pediatric populations by extending existing marketing protections for an additional 6 months. The decreasing stigma associated with seeking treatment for mental health problems, which has been especially pronounced among younger individuals, may have further contributed to the increasing number of prescriptions of psychotropic medications to young people.[49] Although probably less important for young people than adults, the development of disease management and other insurance- and employer-driven mental health quality-of-care efforts for depression and other mental disorders may have contributed to the increase in the number of psychotropic and mental disorder visits during this period.[50-52]

Psychotherapy visits to physicians by children and adolescents remained fairly constant during the study period and

substantially more common among adolescents than children. Although substantially fewer youth visits include psychotherapy than psychotropic medications, considerable progress has been made in the development of specific evidence-based psychotherapies for some of the most common child and adolescent mental disorders.[53-55] Moreover, it remains far from clear whether ongoing changes in the organization and financing of mental health care will continue to support a robust role for psychiatrists and other physicians in providing psychotherapy to young people.[56] In evaluating these trends, it is important to bear in mind that psychotherapy provided by psychologists and social workers, which accounts for approximately one-half of psychotherapy provision, is not included in the analysis.[15]

In contrast to adult mental disorder visits, which were predominantly by female patients, adolescent and especially child mental disorder visits were mostly by male patients. This sex difference likely reflects underlying differences in the treated mental disorders. Disruptive behavior disorders, which are more commonly diagnosed in male patients than female patients,[57] accounted for most of the child mental disorder visits. Anxiety and mood disorders, which occur more commonly among female patients than male patients,[58,59] were the most common diagnoses among the adult mental disorder visits. Higher rates of disruptive behavior disorders among ethnic/racial minorities[60,61] may also help to explain the larger proportion of child, rather than adolescent or adult, mental disorder visits that were by Hispanic and non-Hispanic black patients. Medicaid, which is available to all low-income children, paid for a larger share of child, rather than adult, mental disorder visits and may also help to account for the ethnic/racial visit distributions.

These analyses have several limitations. First, the National Ambulatory Medical Care Survey samples visits rather than patients. Because an unknown quantity of patient duplication occurs, it is not possible to derive the number of unique people who are treated in office-based practice with various indications of mental health care each year. However, because each physician is randomly assigned to 1 of 52 weeks in the survey year, duplication likely has only a limited effect on national estimates of unduplicated visits. Second, diagnoses are based on the independent judgment of the treating physician, rather than research diagnostic interviews. Third, information is not available concerning dosages of the psychotropic medications, duration of treatment episodes, which medications are intended to treat which disorders, type of psychotherapy provided by nonphysician health care professionals, and medication prescriptions by nonphysicians. Fourth, physician nonresponse may have biased the observed pattern of mental health care use. Finally, the sample is restricted to physician visits in office-based and community health center practices and therefore does not capture visits to community mental health centers, hospital outpatient clinics, emergency departments, and various other outpatient settings that may disproportionately serve low-income families.[62] For these reasons, the population-based results should not be interpreted as representing population-wide mental health care use.

Conclusions

Over the last several years, there has been an expansion in mental health care to children and adolescents in office-based medical practice. This growth, which coincided with an increase in the number of prescriptions of psychotropic medications, offers new clinical opportunities to relieve the psychological distress associated with the common childhood and adolescent psychiatric disorders. Yet it also poses risks related to adverse medication effects,[45,63] delivery of non-evidence-based care,[64] and poorly coordinated services.[65] The bulk of the increased provision for child and adolescent mental health care in office-based medical settings occurred outside of psychiatric practice. With these evolving practice patterns, tensions will inevitably arise between access and quality of care. To meet this challenge, there is a pressing need to develop and implement effective models of collaboration among pediatricians, family practitioners and other nonpsychiatrist physicians who treat children and adolescents, and suitably trained mental health care specialists.[35,66]

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