

# A Commercial Insurance Claims Analysis of Correlates of Behavioral Therapy Use Among Children With ADHD

James G. Waxmonsky, M.D., Raman Baweja, M.D., Guodong Liu, Ph.D., Daniel A. Waschbusch, Ph.D., Benjamin Fogel, M.D., Doug Leslie, Ph.D., William E. Pelham Jr., Ph.D.

**Objective:** The study examined factors associated with uptake of behavioral therapy among children with attention-deficit hyperactivity disorder (ADHD).

**Methods:** Insurance claims data from 2008–2014 (MarketScan) were reviewed to examine associations between behavioral therapy use and demographic, patient, family, and provider factors. The association between ADHD medication use and future uptake of behavioral therapy was examined with logistic regression adjusted for covariates found to affect behavioral therapy use.

**Results:** Among 827,396 youths with ADHD, under 50% received any billable behavioral therapy services over the 7 years. ADHD severity, gender, region of residence, assessment year, comorbid behavioral disorders, and behavioral therapy use by siblings were significantly associated with behavioral therapy use ( $p < 0.001$ ). Parent psychopathology and sibling medication use was not. Children

prescribed ADHD medication were 2.5 times less likely than those not prescribed medication to use behavioral therapy, even after adjustment for severity of behavioral health symptoms and other covariates (odds ratio [OR] = 0.41, 95% confidence interval [CI] = 0.40–0.41,  $p < 0.001$ ). Effects of medication use were stronger for future uptake of behavioral therapy (OR = 0.25, 95% CI = 0.24–0.25,  $p < 0.001$ ). The impact of medication use on behavioral therapy use was equally strong for children under age 6 and for older children and did not weaken after release of 2011 guidelines recommending behavioral therapy as the initial ADHD treatment for young children.

**Conclusions:** Multiple systems, family, patient and provider factors affected behavioral therapy uptake. ADHD medication was a robust and potentially modifiable factor. It may be advisable to engage families in behavioral therapy prior to initiation of ADHD medication.

*Psychiatric Services* 2019; 70:1116–1122; doi: 10.1176/appi.ps.201800473

Over 10% of youths in the United States are diagnosed as having attention-deficit hyperactivity disorder (ADHD) (1). It has two well-established treatments: medications (predominantly central nervous system [CNS] stimulants) and behavioral therapies. Medication is the most common treatment across ages and produces the largest and quickest reduction in symptoms (2–5). Behavioral therapy is the recommended initial treatment for young children (5) and significantly reduces symptoms and improves functioning in school-age youths (2, 6, 7). Medication is the recommended initial treatment for adolescents because of the larger evidence base, but there is emerging evidence that behavioral therapy is efficacious (5, 8). Adding behavioral therapy to medication optimizes functioning, reduces the dose of medication needed (2, 9–11), and may improve how desirable parents rate treatment (12). Despite these benefits, rates of behavioral therapy use are low. According to the Centers for Disease Control and Prevention, nearly three-quarters of children with ADHD use medication, but less than half received any behavioral

therapy in the past year, leading to calls for identifying barriers to behavioral therapy (3, 13).

## HIGHLIGHTS

- Behavioral therapies remain underutilized for children with ADHD, even among young children, but there has been little systematic examination of barriers to use of behavioral therapy.
- Analyses of insurance claims data from 2008–2014 found that children prescribed ADHD medication were significantly less likely than those not prescribed medication to use any behavioral therapy.
- The negative association between medication use and use of behavioral therapy for ADHD was significant among children under age 6, for whom behavioral therapy is the recommended treatment.
- The negative association persisted after adjustment for demographic factors, severity of behavioral health symptoms, and other psychopathology of the child and family.

One of the primary theorized reasons for poor behavioral therapy uptake is limited availability; patients must access specialty centers to receive it, whereas medication is widely available in primary care (13–15). However, rates vary widely in areas with similar provider densities (16). There has been a nationwide trend toward integrating pediatric behavioral health services into primary care (17) and developing statewide care coordination to link families with resources (18, 19), which should increase behavioral therapy uptake. However, recent studies show little change, with under a third of patients with ADHD currently receiving any behavioral therapy (3), while rates of ADHD diagnosis and medication treatment have increased (1, 20, 21). Therefore, it appears that simply increasing access may not resolve the problem. Patient and provider factors have been identified as possible barriers but have not been systematically explored (4, 22).

In a federally funded randomized controlled trial (RCT), we examined the sequencing effects of ADHD treatments (23). All care was free and accessible. Families were significantly less likely to use behavioral therapy after starting medication than they were before starting medication, even when high levels of impairment persisted after medication treatment. Medication followed by behavioral therapy was the least efficacious and least cost-effective sequence, in part because of poor rates of behavioral therapy uptake following medication. In contrast, behavioral therapy did not inhibit medication initiation (23, 24).

Given the frequency of ADHD medication use (1–5, 25), even a mild negative association of medication with behavioral therapy could have sizable impacts. Therefore, we examined predictors of behavioral therapy use in clinical practice in a large medical claims database. It was hypothesized that medication use would be associated with reduced behavioral therapy uptake after the analysis adjusted for other factors influencing the use of behavioral therapy (13, 16, 26–28).

## METHODS

### Procedures and Measures

We completed a retrospective review of insurance claims from 2008–2014 by using the MarketScan Commercial Claims and Encounters database (IBM Truven Health Analytics). The study was not classified as human subjects research and was exempted by the governing institutional review board. MarketScan consists of reimbursed health care claims from a selection of large employers and commercial health plans. It has claims information from more than 50 million employees and family members per year, ages 0–64. Claims are identified by a unique enrollee identifier containing information on inpatient, outpatient, and prescription drug use, plus patient age, gender, geographic location, and type of insurance. The family identifier, a unique one- to nine-digit number, groups families in the data. Medical diagnoses were coded by *ICD-9* and medical

procedures by Current Procedural Terminology, 4th edition, and Healthcare Common Procedure Coding System.

Medication use was defined as filling at least one prescription during the assessment period. We included all Food and Drug Administration (FDA)-approved ADHD medications plus clonidine and guanfacine because they are commonly prescribed for ADHD (29). Other off-label medications commonly used for indications besides ADHD, such as bupropion, were not included. Receipt of behavioral therapy was measured by review of billing codes for any individual, family, or group counseling and defined as at least one code for a billable service during the 7-year span. Codes included 90804–90809, 90816–90819, 90821, 90822, 90846, 90847, 90849, 90853, G0410, G0411, H0035–H0037, H2012, H2013, H2017–H2020, S9480, and T1027.

### Study Population

Included cases were patients ages 0–17 during any of the seven annual cohorts (2008–2014) with at least two documented visits with an ADHD billing code and at least 1 year of enrollment in the database. One year of enrollment was required to ensure that families had reasonable time to access treatment after receipt of an ADHD diagnosis. *ICD-9* codes for ADHD included 314.00, 314.01, and 314.9.

### Covariates

The pool of ADHD patients was stratified by age (<6, 6–12, and ≥13), gender, geographic region (West, South, Northeast, North-Central, and unknown), type of medical provider seen (primary care only versus psychiatrist or psychiatric nurse practitioner [psychiatric provider]), treatment year, presence of any comorbid psychiatric disorder (all *ICD-9* behavioral health codes), presence of a disruptive behavior disorder (codes 312.8, conduct disorder; 313.81, oppositional defiant disorder; and 312.9, disruptive behavior disorder not otherwise specified), and severity of behavioral health disorder. Severe presentations were defined as receipt of behavioral health care in an emergency room or inpatient setting for any behavioral health condition. We also examined the impact of use of behavioral therapy and ADHD medication use by older siblings with ADHD and psychiatric disorders of parents, defined as having at least one diagnostic code for any psychiatric disorder.

### Statistical Analyses

Descriptive analyses were used for exploring cohort demographic factors and distributions of variables. Univariate associations between each factor of interest and the outcome variable were examined by using chi-square tests and Fisher's exact test for categorical variables and *t* tests or Wilcoxon rank sum tests for continuous variables. Multivariable analysis was performed by using logistic regression. A model was computed to examine rates of behavioral therapy use among medication users versus nonmedication users while adjusting for effects of covariates. To examine the association of medication use on future behavioral therapy use, we

**TABLE 1. Characteristics of commercially insured children with ADHD (N=827,396), by use of ADHD medication, 2008–2014**

Characteristic	No medication (N=252,508)		Medication (N=574,888)	
	N	%	N	%
Gender				
Male	172,975	68.5	400,772	69.7
Female	79,533	31.5	174,116	30.3
Age				
<6	28,599	11.5	29,970	5.3
6–12	136,384	52.7	346,405	60.2
>12	87,525	34.7	158,700	34.5
U.S. census region				
West	45,103	17.9	75,305	13.1
South	86,764	34.4	262,854	45.7
Northeast	39,003	15.4	68,791	12.0
North-Central	81,640	32.3	167,936	29.2
Seen by psychiatric provider				
No	224,280	88.8	511,831	89.0
Yes	28,228	11.2	63,057	11.0
Any behavioral therapy				
No	87,026	34.5	331,422	57.6
Yes	165,482	65.5	243,466	42.6
Severe behavioral health issues <sup>a</sup>	23,427	9.3	49,043	8.5
Any psychiatric comorbidity <sup>b</sup>	130,073	51.5	296,863	51.6
Disruptive behavior disorder	7,829	3.1	13,683	2.4
Older sibling with ADHD treated with behavioral therapy	7,414	2.9	24,319	4.2
Older sibling with ADHD treated with medication	16,070	6.4	31,652	5.5
Parent with a psychiatric disorder <sup>b</sup>	69,954	27.7	164,352	28.6

<sup>a</sup> Receipt of inpatient or emergency department services for any behavioral health condition.<sup>b</sup> Any ICD-9 behavioral health code.

reran the analyses excluding patients who had received any billable behavioral therapy service before medication. A lookback period was not employed in the primary analyses, but sensitivity analyses were run that limited the cohort to those with no ADHD codes or ADHD medications for 6 months prior to the assessment period. All analyses were performed with SAS, version 9.4. All statistical tests were two-sided, with *p* values less than 0.05 considered statistically significant.

## RESULTS

### Cohort Characteristics

There were 2,564,481 patients with at least one ADHD diagnostic code during the assessed periods (2008–2014). When additional entry criteria were applied, 827,396 patients were eligible for the study [a flow chart showing the study cohort is available in an online supplement to this article]. Most were male, ages 6–12, and not treated by psychiatric providers (Table 1). A total of 72,470 (8.8%) met the severity threshold (receipt of care in an emergency room or inpatient setting), 75,291 (9.1%) had older siblings with ADHD, 234,306 (28.3%) had a parent with a diagnosis of a mental disorder, 426,936 (51.6%) had a code for any

comorbid behavioral health condition over the entire assessment period, and 21,512 (2.6%) had a code for a comorbid disruptive behavior disorder. The mean assessment duration was 1,293 days (3.5 years). The study cohort composition was fairly balanced across 2008 to 2014, with annual cohorts between 100,000 and 135,000 (Table 2).

### Treatment Rates and Sequences

During the assessment period, 20.0% (N=165,482) were treated with only behavioral therapy, 40.1% (N=331,422) with medication alone, 29.4% (N=243,466) with both, and 10.5% (N=87,026) with neither. There was no meaningful increase in use of behavioral therapy from 2008 to 2014 (Table 2). Most behavioral therapy codes were for individual therapy (Figure 1). Of the 408,948 patients with behavioral therapy codes, 209,937 (51.3%) had at least four billed sessions in any 4-month period. Among patients using both behavioral therapy and medication during the 7-year assessment period, medication was started first in 54.6% of cases (N=451,758). When the 6-month lookback period was included—which reduced the sample size—56.1% of patients (N=246,744) used medication first.

### Behavioral Therapy Predictors

Children for whom any ADHD medication prescriptions were filled were significantly less likely to use behavioral therapy, compared with those who had no filled prescriptions (odds ratio [OR]=0.39, 95% confidence interval [CI]=0.37–0.41, *p*<0.001). This relationship was essentially unchanged when the analysis adjusted for covariates (OR=0.41, 95% CI=0.40–0.41, *p*<0.001) (Table 3). Significantly increased use of behavioral therapy was associated with age (>6 and >12 versus ages 6–12); female gender; seeing a psychiatric provider (versus primary care only); living in the North-Central region (versus Northeast, West or South, West region (versus Northeast or South), and Northeast region (versus South); having a comorbid behavioral health condition or a severe presentation, and having an older sibling with ADHD who used behavioral therapy regardless of his or her ADHD medication status (versus having an ADHD sibling who did not use behavioral therapy) (*p*<.001 for all). Neither parental psychopathology nor sibling ADHD medication use was associated with behavioral therapy use. Sensitivity analyses limiting the cohort to those with no ADHD billing codes for 6 months before the assessment period (N=421,803) produced no meaningful change in results.

Restricting the sample to children under age 6 (N=58,569), produced similar associations between medication use and use of behavioral therapy (OR=0.42, 95%

CI=0.37–0.48,  $p<0.001$ ). The associations between medication and behavioral therapy after release of the 2011 American Academy of Pediatrics ADHD guidelines for children under age 6 were not significantly different, compared with previous years (OR=0.98, 95% CI=0.93–1.05).

### Future Behavioral Therapy Uptake

To examine the impact of medication use on future use

of behavioral therapy, we excluded patients who had used behavioral therapy prior to using ADHD medication (N=111,942), which left a sample of 715,454 patients. The negative association was stronger in this analysis (OR=0.25, 95% CI=0.24–0.25,  $p<0.001$ ). Effects were nearly identical for the 52,377 children under age 6 who did not use behavioral therapy before medication during the assessment period (OR=0.26, 95% CI=0.21–0.31,  $p<0.001$ ).

## DISCUSSION

Multiple variables were associated with increased behavioral therapy uptake, including age, geographic region, gender, prescriber type, severity of presentation, and psychiatric comorbidity. Children prescribed medication were 2.5 times less likely to use behavioral therapy than those not prescribed medication. Medication was associated with a fourfold reduction in future behavioral therapy uptake, even among preschoolers. This association held after the analysis adjusted for multiple covariates affecting behavioral therapy uptake. Results parallel what was observed in an RCT, in which despite robust medication effects, use of behavioral therapy before medication produced better outcomes at lower costs than the reverse sequence, partly because of poor uptake of behavioral therapy by participants who were initially prescribed medication (23, 24). Because over 6% of U.S. school-age youths are treated with CNS stimulants (1) and because medications are the most common initial ADHD treatment (30), the potential impact of these findings is appreciable. To the extent that combined treatments enhance long-term functioning over unimodal treatments (31, 32), the negative association of use of one treatment with use of the other could partly explain why medication alone produces limited long-term benefits even when adherence is strong (33, 34).

The rate of use of any behavioral therapy approached 50%, comparable to rates in past studies (3, 13, 35). However, it appears that the rate of receipt of potentially efficacious behavioral therapy was far lower than 50%. The number of therapy sessions attended affects outcomes (36, 37). In any

**TABLE 2. Treatment utilization rates among commercially insured children with ADHD (N=827,396), by study year<sup>a</sup>**

Year	Behavioral therapy only		Medication only <sup>b</sup>		Both <sup>c</sup>		No treatment		Total patients with ADHD diagnosis
	N	%	N	%	N	%	N	%	
2008	23,961	22.8	48,401	46.1	20,485	19.5	12,178	11.6	105,025
2009	23,743	23.2	46,641	45.5	20,282	19.8	11,798	11.5	102,464
2010	26,364	22.9	52,591	45.6	22,715	19.7	13,602	11.8	115,272
2011	30,630	23.0	61,309	46.0	26,504	19.9	14,760	11.1	133,203
2012	31,051	22.9	62,891	46.3	28,122	20.7	13,681	10.1	135,745
2013	26,994	23.1	51,541	45.7	23,568	20.9	11,607	10.3	113,710
2014	28,157	22.9	55,946	45.5	25,422	20.7	13,432	10.9	122,957

<sup>a</sup> Treatment was defined as at least one billing code for the indicated service in the specific year. Codes included 90804–90809, 90816–90818, 90819, 90821, 90822, 90846, 90847, 90849, 90853, G0410, G0411, H0035–H0037, H2012, H2013, H2017–H2020, S9480, and T1027.

<sup>b</sup> Included all FDA-approved medications for ADHD as well as clonidine and guanfacine.

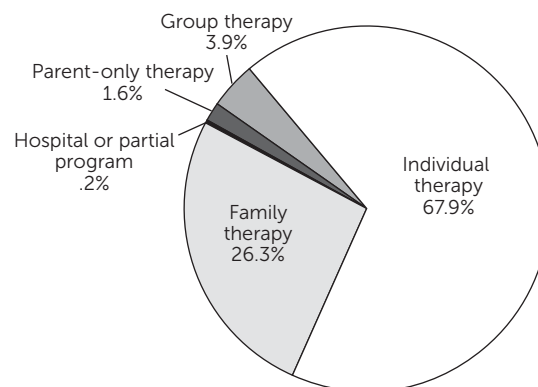
<sup>c</sup> Defined as receiving at least one “dose” of each modality in that year.

4-month span, barely 50% of youths attended at least four sessions, which is half the duration of the shortest evidence-based programs (38). Under 2% of therapy codes were for parent-only sessions, one of the most well-supported formats for ADHD treatment (6). Individual therapy accounted for most sessions, and many forms of this modality are not evidence based for ADHD (5, 10). Hence, both the dose and format of received therapy services may often be suboptimal.

Systems, parent, and provider factors have been identified as barriers (4, 22, 27, 39). Offering services in easily accessible settings and using engagement interventions to increase motivation for care increase uptake of therapy (40–43). In a prior RCT, engagement techniques were employed while free and accessible therapy was offered in the same setting as medication. Yet, use of medication was still significantly associated with lower behavioral therapy uptake (23). Therefore, a multimethod approach targeting patients, parents, and providers may be needed to meaningfully increase rates of use of behavioral therapy.

What drives this negative association of medication use with behavioral therapy uptake could not be ascertained in this analysis. One possibility is that medication alleviates any need for additional treatment. We adjusted for severity, and this relationship persisted, although our severity threshold

**FIGURE 1. Formats of behavioral therapy used by 18,038,878 commercially insured children with ADHD, 2008–2014**





**TABLE 3. Predictors of behavioral therapy use by commercially insured children with ADHD, 2008–2014**

Variable	Adjusted OR	95% Wald CI	p
Age group (reference: 6–12)			
<6	1.27	1.26–1.29	<.001
>12	1.27	1.26–1.28	<.001
Census region (reference: North-Central)			
West	.98	.97–.99	<.001
South	.58	.58–.59	<.001
Unknown	.90	.88–.93	<.001
Northeast	.92	.90–.93	<.001
Male (reference: female)	.76	.75–.77	<.001
Psychiatrist or psychiatric nurse practitioner (reference: primary care provider)	2.67	2.64–2.70	<.001
Year	.89	.89–.90	<.001
Any psychiatric comorbidity (reference: none) <sup>a</sup>	1.42	1.32–1.51	<.001
Other behavioral disorder (reference: none) <sup>b</sup>	1.76	1.32–2.21	<.001
Severe presentation (reference: not severe) <sup>c</sup>	2.43	2.20–2.65	<.001
Use of ADHD medication (reference: no medication use) <sup>d</sup>	.41	.40–.41	<.001
Older sibling with ADHD <sup>e</sup>			
Used medication (reference: did not use)	.99	.98–1.00	.13
Used behavioral therapy (reference: no behavioral therapy use)	1.02	1.01–1.04	<.001
Used ADHD medication and behavioral therapy (reference: no use of either)	1.01	1.01–1.02	<.001
Parent with a psychiatric disorder (reference: no psychiatric disorder) <sup>a</sup>	.99	.98–1.00	.29

<sup>a</sup> Any ICD-9 behavioral health code.<sup>b</sup> Only ICD-9 codes 313.81, 312.8X, and 312.9.<sup>c</sup> Severity defined categorically as receipt of inpatient or emergency department services for any behavioral health condition.<sup>d</sup> Defined as filling at least one prescription for an ADHD medication.<sup>e</sup> Sibling use of behavioral therapy defined as having at least one billing code for that sibling; medication use defined as at least one prescription filled for that sibling.

was coarsely limited to use of emergency or inpatient services. Medication effects on use of behavioral therapy were also robust in a federally funded study in which only children manifesting objectively verified impairment after 8 weeks of systematic medication treatment were randomly assigned to receive additional treatment (23). Availability of therapy providers is limited, and they are often not located in the same setting as medication prescribers. However, low uptake occurs even when access is readily available, such as in integrated primary care practices (16, 41, 44). Combined treatments may be too burdensome for families, but previous studies have not found that use of behavioral therapy inhibits use of medication (23, 44, 45).

We theorize that the immediate and visible reduction in ADHD symptoms produced by medication (2, 46) reduces parental and possibly provider motivation to seek more intensive treatments because time commitments are a barrier to use of behavioral therapy (47). Symptom changes are

easily observed, but acute symptomatic improvement and sustained functional improvements are poorly correlated because impairment often persists when symptoms remit (48–50). This disconnect makes it challenging to predict long-term outcomes based on initial response. Therefore, increased dissemination efforts focusing on ADHD as a chronic condition (5), emphasizing functional remission over acute symptomatic improvement, and using impairment versus symptoms as the metric for titrating treatment may improve behavioral therapy uptake.

Children under 6 (versus those 6–12), those with more severe clinical courses, and those with comorbid psychiatric disorders were more likely to receive behavioral therapy. These findings are consistent with prior work (3, 13, 22, 44) and treatment guidelines in which behavioral therapy is the recommended first-line treatment for young children (5, 46, 51, 52). For school-age youths, medication is recommended as a core component of ADHD treatment (5, 46). Combining behavioral therapy with medication can optimize long-term functioning at lower medication dosages; therefore, it would be reasonable to consider behavioral therapy as an adjunctive treatment for medicated youths of all ages (9, 11). However, the sequence of medication followed by behavioral therapy is less efficacious and cost-effective than the sequence that starts with behavioral therapy (23, 24). Yet medication first is the most common pattern according to these results and other naturalistic studies (30, 45). Therefore, it does not seem advisable to

refer patients for behavioral therapy only when impairment persists after medication treatment. Delaying behavioral therapy until after medication use may be one reason why it has been challenging to find evidence of improved long-term outcomes for youths with ADHD despite large increases in health care spending for this disorder over the past 2 decades (34, 53).

The primary limitation of this study was the exclusion of children with public health insurance. Past work has found higher rates of use of behavioral therapy among youths covered by Medicaid (3, 13, 22, 35, 45, 54). It is possible that the impact of medication use on behavioral therapy use may be lower in this population. Therefore, replication of results in a nationwide pool of publicly insured youths is advised. However, even when publicly insured youths are included, rates of use of behavioral therapy remain well below rates of medication use regardless of patient age (4, 13, 25, 30). Because of limitations of the data set, we could not measure the

impact of race or ethnicity, verify family relationships, or determine whether patients exiting and returning to insurance coverage were counted as the same or distinct cases. Our analyses would miss unbilled services, such as those provided through schools. However, past studies that included school-based supports found similar predictors of use of behavioral therapy (3, 13, 22). We were not able to verify the diagnosis of ADHD but we required that an ADHD diagnostic code be present for at least two separate visits. Unlike other behavioral health conditions, ADHD is not thought to be underreported (55). Rates of comorbid behavior disorders were low for an ADHD sample (56) but consistent with those in past studies of claims data (57), which was likely attributable to providers preferentially billing for ADHD because it is the only disruptive behavior disorder with FDA-approved medications.

## CONCLUSIONS

In a sample of over 800,000 privately insured youths with ADHD, ADHD medication use was a robust predictor of behavioral therapy uptake. Children prescribed ADHD medication were 2.5 times less likely to have used behavioral therapy and were four times less likely to use behavioral therapy in the future, compared with youths not prescribed ADHD medication. Effects were strong for both younger and older youths. These results suggest that the common sequence of medication initiated in primary care followed by referral for behavioral therapy may not be the ideal pathway, because behavioral therapies were even less likely to be used once medication had been prescribed. Future work should examine in naturalistic settings whether use of behavioral therapy with or before medication treatment is associated with increased treatment use and subsequent improvement in long-term outcomes.

## AUTHOR AND ARTICLE INFORMATION

Department of Psychiatry (Waxmonsky, Baweja, Waschbusch), Department of Public Health Sciences (Liu, Leslie), and Department of Pediatrics (Fogel), Penn State College of Medicine, Hershey, Pennsylvania; Center for Children and Families, Department of Psychology, Florida International University, Miami (Pelham). Send correspondence to Dr. Waxmonsky (jwaxmonsky@pennstatehealth.psu.edu). Study results were presented at the annual meeting of the American Psychiatric Association, San Diego, May 20–24, 2017.

Funding for this study was from an internal grant from the Department of Psychiatry, Penn State Health, to Drs. Baweja and Waxmonsky. The authors acknowledge Sara Mills, M.S., for editorial assistance. They also acknowledge support from the Penn State Center for Applied Studies in Health Economics.

Dr. Waxmonsky reports receipt of research funding from Pfizer and Supernus and service on advisory boards for Iron Shore, NLS Pharma, Noven, and Purdue Pharma. Dr. Fogel reports receipt of funding from Pfizer. The other authors report no financial relationships with commercial interests.

Received October 17, 2018; revisions received June 3 and July 18, 2019; accepted July 19, 2019; published online August 27, 2019.

## REFERENCES

1. Visser SN, Danielson ML, Bitsko RH, et al: Trends in the parent-report of health care provider–diagnosed and medicated attention-deficit/hyperactivity disorder: United States, 2003–2011. *J Am Acad Child Adolesc Psychiatry* 2014; 53:34–46.e2
2. The MTA Cooperative Group: A 14-month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. *Arch Gen Psychiatry* 1999; 56:1073–1086
3. Danielson ML, Visser SN, Chronis-Tuscano A, et al: A national description of treatment among United States children and adolescents with attention-deficit/hyperactivity disorder. *J Pediatr* 2018; 192:240–246.e1
4. Visser SN, Danielson ML, Wolraich ML, et al: Vital signs: national and state-specific patterns of attention deficit/hyperactivity disorder treatment among insured children aged 2–5 years—United States, 2008–2014. *MMWR Morb Mortal Wkly Rep* 2016; 65:443–450
5. Wolraich M, Brown L, Brown RT, et al: ADHD: clinical practice guideline for the diagnosis, evaluation, and treatment of attention-deficit/hyperactivity disorder in children and adolescents. *Pediatrics* 2011; 128:1007–1022
6. Fabiano GA, Schatz NK, Aloe AM, et al: A systematic review of meta-analyses of psychosocial treatment for attention-deficit/hyperactivity disorder. *Clin Child Fam Psychol Rev* 2015; 18:77–97
7. Evans SW, Owens JS, Wymbs BT, et al: Evidence-based psychosocial treatments for children and adolescents with attention deficit/hyperactivity disorder. *J Clin Child Adolesc Psychol* 2018; 47:157–198
8. Sibley MH, Kuriyan AB, Evans SW, et al: Pharmacological and psychosocial treatments for adolescents with ADHD: an updated systematic review of the literature. *Clin Psychol Rev* 2014; 34:218–232
9. Conners CK, Epstein JN, March JS, et al: Multimodal treatment of ADHD in the MTA: an alternative outcome analysis. *J Am Acad Child Adolesc Psychiatry* 2001; 40:159–167
10. Froehlich TE, Brinkman WB: Multimodal treatment of the school-aged child with attention-deficit/hyperactivity disorder. *JAMA Pediatr* 2018; 172:109–110
11. Arnold LE, Hodgkins P, Caci H, et al: Effect of treatment modality on long-term outcomes in attention-deficit/hyperactivity disorder: a systematic review. *PLoS One* 2015; 10:e0116407
12. Waschbusch DA, Cunningham CE, Pelham WE, et al: A discrete choice conjoint experiment to evaluate parent preferences for treatment of young, medication naive children with ADHD. *J Clin Child Adolesc Psychol* 2011; 40:546–561
13. Visser SN, Bitsko RH, Danielson ML, et al: Treatment of attention deficit/hyperactivity disorder among children with special health care needs. *J Pediatr* 2015; 166:1423–1430
14. Visser SN, Deubler EL, Bitsko RH, et al: Demographic differences among a national sample of US youth with behavioral disorders. *Clin Pediatr* 2016; 55:1358–1362
15. Olsson M, Blanco C, Wang S, et al: National trends in the mental health care of children, adolescents, and adults by office-based physicians. *JAMA Psychiatry* 2014; 71:81–90
16. Gellad WF, Stein BD, Ruder T, et al: Geographic variation in receipt of psychotherapy in children receiving attention-deficit/hyperactivity disorder medications. *JAMA Pediatr* 2014; 168:1074–1076
17. DeMaso D: A Guide to Building Collaborative Mental Health Care Partnerships in Pediatric Primary Care. Washington, DC, American Academy of Child and Adolescent Psychiatry, 2010
18. Hilt RJ, Romaine MA, McDonnell MG, et al: The Partnership Access Line: evaluating a child psychiatry consult program in Washington State. *JAMA Pediatr* 2013; 167:162–168
19. Straus JH, Sarvet B: Behavioral health care for children: the Massachusetts Child Psychiatry Access Project. *Health Aff* 2014; 33:2153–2161
20. Burcu M, Zito JM, Metcalfe L, et al: Trends in stimulant medication use in commercially insured youths and adults, 2010–2014. *JAMA Psychiatry* 2016; 73:992–993

21. Xu G, Strathearn L, Buyun L, et al: Twenty year trends in ADHD among US children and adolescents, 1997–2016. *JAMA Pediatr* 2018; 1:e181471
22. Walls M, Allen C, Cabral H, et al: Receipt of medication and behavioral therapy among a national sample of school-age children diagnosed with attention-deficit/hyperactivity disorder. *Acad Pediatr* 2018; 18:256–265
23. Pelham WE Jr, Fabiano GA, Waxmonsky JG, et al: Treatment sequencing for childhood ADHD: a multiple-randomization study of adaptive medication and behavioral interventions. *J Clin Child Adolesc Psychol* 2016; 45:396–415
24. Page TF, Pelham WE 3rd, Fabiano GA, et al: Comparative cost analysis of sequential, adaptive, behavioral, pharmacological, and combined treatments for childhood ADHD. *J Clin Child Adolesc Psychol* 2016; 45:416–427
25. Patel A, Medhekar R, Ochoa-Perez M, et al: Care provision and prescribing practices of physicians treating children and adolescents with ADHD. *Psychiatr Serv* 2017; 68:681–688
26. Pastor PN, Simon AE, Reuben CA: ADHD: insurance and mental health service use. *Clin Pediatr* 2017; 56:729–736
27. Larson J, dosReis S, Stewart M, et al: Barriers to mental health care for urban, lower income families referred from pediatric primary care. *Adm Policy Ment Health Ment Health Serv Res* 2013; 40:159–167
28. Chacko A, Wymbs BT, Rajwan E, et al: Characteristics of parents and children with ADHD who never attend, drop out and complete behavioral parent training. *J Child Fam Stud* 2017; 26: 950–960
29. Hales CM, Kit BK, Gu Q, et al: Trends in prescription medication use among children and adolescents—United States, 1999–2014. *JAMA* 2018; 319:2009–2020
30. Moran A, Serban N, Danielson ML, et al: Adherence to recommended care guidelines in the treatment of preschool-age Medicaid-enrolled children with a diagnosis of ADHD. *Psychiatr Serv* 2019; 70:26–34
31. Evans SW, Owens JS, Bunford N: Evidence-based psychosocial treatments for children and adolescents with attention-deficit/hyperactivity disorder. *J Clin Child Adolesc Psychol* 2014; 43: 527–551
32. Aman MG, Bukstein OG, Gadow KD, et al: What does risperidone add to parent training and stimulant for severe aggression in child attention-deficit/hyperactivity disorder? *J Am Acad Child Adolesc Psychiatry* 2014; 53:47–60
33. Molina BS, Hinshaw SP, Swanson JM, et al: The MTA at 8 years: prospective follow-up of children treated for combined-type ADHD in a multisite study. *J Am Acad Child Adolesc Psychiatry* 2009; 48:484–500
34. Swanson JM, Arnold LE, Molina BSG, et al: Young adult outcomes in the follow-up of the Multimodal Treatment Study of attention-deficit/hyperactivity disorder: symptom persistence, source discrepancy, and height suppression. *J Child Psychol Psychiatry* 2017; 58:663–678
35. Danielson ML, Bitsko RH, Ghandour RM, et al: Prevalence of parent-reported ADHD diagnosis and associated treatment among US children and adolescents, 2016. *J Clin Child Adolesc Psychol* 2018; 47:199–212
36. Chacko A, Jensen SA, Lowry LS, et al: Engagement in behavioral parent training: review of the literature and implications for practice. *Clin Child Fam Psychol Rev* 2016; 19:204–215
37. Pelham WE Jr, Fabiano GA: Evidence-based psychosocial treatments for attention-deficit/hyperactivity disorder. *J Clin Child Adolesc Psychol* 2008; 37:184–214
38. Fabiano GA, Pelham WE Jr, Coles EK, et al: A meta-analysis of behavioral treatments for attention-deficit/hyperactivity disorder. *Clin Psychol Rev* 2009; 29:129–140
39. Rushton J, Bruckman D, Kelleher K: Primary care referral of children with psychosocial problems. *Arch Pediatr Adolesc Med* 2002; 156:592–598
40. Kolko DJ, Campo J, Kilbourne AM, et al: Collaborative care outcomes for pediatric behavioral health problems: a cluster randomized trial. *Pediatrics* 2014; 133:e981–e992
41. Silverstein M, Hironaka LK, Walter HJ, et al: Collaborative care for children with ADHD symptoms: a randomized comparative effectiveness trial. *Pediatrics* 2015; 135:e858–e867
42. Haine-Schlagel R, Walsh NE: A review of parent participation engagement in child and family mental health treatment. *Clin Child Fam Psychol Rev* 2015; 18:133–150
43. Chronis AM, Chacko A, Fabiano GA, et al: Enhancements to the behavioral parent training paradigm for families of children with ADHD: review and future directions. *Clin Child Fam Psychol Rev* 2004; 7:1–27
44. Ji X, Druss BG, Lally C, et al: Racial-ethnic differences in patterns of discontinuous medication treatment among Medicaid-insured youths with ADHD. *Psychiatr Serv* 2018; 69:322–331
45. Stein BD, Klein GR, Greenhouse JB, et al: Treatment of attention-deficit hyperactivity disorder: patterns of evolving care during the first treatment episode. *Psychiatr Serv* 2012; 63:122–129
46. Pliszka S: Practice parameter for the assessment and treatment of children and adolescents with attention-deficit/hyperactivity disorder. *J Am Acad Child Adolesc Psychiatry* 2007; 46:894–921
47. Heinrichs N, Bertram H, Kuschel A, et al: Parent recruitment and retention in a universal prevention program for child behavior and emotional problems: barriers to research and program participation. *Prev Sci* 2005; 6:275–286
48. O'Connor BC, Garner AA, Peugh JL, et al: Improved but still impaired: symptom-impairment correspondence among youth with attention-deficit hyperactivity disorder receiving community-based care. *J Dev Behav Pediatr* 2015; 36:106–114
49. Kollins SH: Moving beyond symptom remission to optimize long-term treatment of attention-deficit/hyperactivity disorder. *JAMA Pediatr* 2018; 172:901–902
50. Hechtman L, Swanson JM, Sibley MH, et al: Functional adult outcomes 16 years after childhood diagnosis of attention-deficit/hyperactivity disorder: MTA results. *J Am Acad Child Adolesc Psychiatry* 2016; 55:945–952
51. Steiner H, Remsing L: Practice parameter for the assessment and treatment of children and adolescents with oppositional defiant disorder. *J Am Acad Child Adolesc Psychiatry* 2007; 46:126–141
52. Eyberg SM, Nelson MM, Boggs SR: Evidence-based psychosocial treatments for children and adolescents with disruptive behavior. *J Clin Child Adolesc Psychol* 2008; 37:215–237
53. Bui AL, Dieleman JL, Hamavid H, et al: Spending on children's personal health care in the United States, 1996–2013. *JAMA Pediatr* 2017; 171:181–189
54. Epstein JN, Kelleher KJ, Baum R, et al: Variability in ADHD care in community-based pediatrics. *Pediatrics* 2014; 134:1136–1143
55. Thomas R, Sanders S, Doust J, et al: Prevalence of attention-deficit/hyperactivity disorder: a systematic review and meta-analysis. *Pediatrics* 2015; 135:e994–e1001
56. Larson K, Russ SA, Kahn RS, et al: Patterns of comorbidity, functioning, and service use for US children with ADHD, 2007. *Pediatrics* 2011; 127:462–470
57. Harpaz-Rotem I, Rosenheck RA: Changes in outpatient psychiatric diagnosis in privately insured children and adolescents from 1995 to 2000. *Child Psychiatry Hum Dev* 2004; 34:329–340