

Use of Practice Guidelines in the Primary Care of Children With Attention-Deficit/Hyperactivity Disorder

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ABSTRACT. *Objectives.* Several guidelines have been published for the care of children with attention-deficit/hyperactivity disorder (ADHD); however, few data describe adoption of practice guidelines. Our study sought 1) to describe primary care diagnosis and management of ADHD, 2) to determine whether the care is in accordance with American Academy of Pediatrics (AAP) practice guidelines, and 3) to describe factors associated with guideline adherence.

Methods. We conducted a mail survey of 1374 primary care physicians in Michigan. Main outcome measures were reported adherence to practices specified in the AAP guidelines; ADHD practice patterns; and other measures, including attitudes about parent, teacher, and community influences on ADHD diagnosis and treatment. Bivariate and multivariate analyses were performed to assess patient and physician factors associated with adherence to guideline components.

Results. The overall response rate was 60%. The majority (77.4%) of primary care physicians were familiar with AAP guidelines on ADHD, and many (61.1%) reported incorporating the guidelines into their practice. Differences were apparent by specialty: 91.5% of pediatricians were familiar with the guidelines in contrast to 59.8% of family physicians. The majority of clinicians reported practices consistent with individual components of the diagnostic and treatment guidelines. However, when adherence to multiple components was analyzed together, only 25.8% of clinicians reported routine use of all 4 diagnostic components in the survey. In addition, some physicians continue to use diagnostic modalities that are currently not recommended for routine evaluation of school-aged children with ADHD—continuous performance testing, neuroimaging, and laboratory tests (eg, thyroid, lead, or iron testing). With regard to ADHD treatment, the majority (66.6%) of respondents reported routine recommendation of pharmacotherapy and titration of medications in the first month when prescribed (81.3%). However, just over half (53.1%) reported routine follow-up visits (3–4 times per year) for children who have ADHD and are taking medications. Most (53.4%) clinicians also recommended behavioral therapy for children who had a diagnosis of ADHD. Patterns of specialty differences were less consistent for treatment components: pediatricians were more likely to recommend medications, but family physicians reported

more frequent follow-up evaluations for children who receive medications. There were no specialty differences in recommendations for behavioral therapy. In addition to physician specialty variations, differences in management were apparent by practice type and other demographic characteristics. There were few significant associations between adherence to guideline components and physician attitudes about parent, teacher, or community influences. However, these factors were noted by many respondents. Only 32.5% agreed that their community had adequate, accessible mental health resources. Half (50.1%) of the physicians reported that insurers limit coverage for assessment and treatment of ADHD.

Conclusions. Primary care physicians generally report awareness of pediatric ADHD guidelines and follow these clinical practice recommendations. However, some physician variations are apparent, and areas for improvement are noted. Many primary care physicians report poor access to mental health services, limited insurance coverage, and other potential system barriers to the delivery of ADHD care. Additional study is needed to confirm provider-reported data; to determine what constitutes high-quality, long-term management of this chronic condition; and to confirm how reported practices associate with long-term outcomes for children with ADHD. *Pediatrics* 2004;114:e23–e28. URL: <http://www.pediatrics.org/cgi/content/full/114/1/e23>; *attention-deficit/hyperactivity disorder, pediatrics, family physicians, practice guidelines, CNS stimulants, mental health services.*

ABBREVIATIONS. ADHD, attention-deficit/hyperactivity disorder; PD, pediatrician; FP, family physician; AAP, American Academy of Pediatrics.

Attention-deficit/hyperactivity disorder (ADHD) is the most common childhood behavioral complaint presenting to pediatricians (PDs) and family physicians (FPs). Recent reports indicate that in addition to a rise in the percentage of mental health visits to primary care physicians for ADHD, sizable increases occurred in the use of diagnostic and treatment services during the 1990s.^{1–4} Reports of a 2- to 3-fold increase in stimulant prescription rates during this time period furthered controversies in the medical literature and popular media regarding the care of children with ADHD.^{4–8} Despite research supporting the use of stimulants,⁹ concern regarding both overdiagnosis of ADHD and treatment with stimulants has continued. The scientific community has focused on the efficacy and risks of treatment while devoting limited attention to the quality and processes of care. The American Academy of Child and Adolescent Psychiatry developed

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practice parameters on the management of ADHD and use of stimulant medications¹⁰; however, these were neither targeted nor disseminated to primary care providers, who see the majority of children with suspected attention-deficit disorders.

To address this void, the American Academy of Pediatrics (AAP) developed evidence-based guidelines for the diagnosis and treatment of children with ADHD. The AAP published 2 sets of ADHD practice guidelines for children aged 6 to 12 years: one for evaluation and the second for management.^{11,12} These guidelines have been reported in various journals and adopted by other organizations, including the American Academy of Family Physicians and large insurers and managed care organizations.^{13,14}

Although the evidence-based standards of ADHD care have been well documented, few data describe adoption of these practices for the care of children with ADHD. Therefore, our study sought to 1) describe the current practice of ADHD care being delivered by primary care physicians, 2) determine whether the care provided is in accordance with AAP practice guideline recommendations, and 3) describe factors associated with guideline adherence. Findings from this study may be used to answer questions about the current care of children with ADHD, to determine potential areas for practice improvement, and to establish targets for additional dissemination and future investigation.

METHODS

We queried the American Medical Association Master File to produce a comprehensive list of all PDs and FPs who practice in Michigan. Our sample excluded physicians who were younger than 30 years or older than 65 years, retirees, Veterans Administration employees, physicians with nongeneralist board or sub-board certification, and had non-Michigan-based office practices. The sampling strategy resulted in a file of 687 PDs and 1547 FPs. We then randomly selected FPs to produce an equal number of physicians (687 PDs, 687 FPs) in each group, for a final sample of 1374 Michigan primary care providers. The first survey mailing, accompanied by a cover letter, \$10 participant incentive, and business reply envelope, was sent during August 2002. Two subsequent mailings to nonresponders were sent at 3-week intervals.

The survey instrument contained 37 items directed at guideline-based practices. Survey items assessed adherence to 10 diagnostic and treatment measures specified in the AAP guidelines (Fig 1). To be consistent with the guidelines, these questions referred to children 6 to 12 years of age. Additional items queried physician demographics; practice characteristics; and attitudes regarding the influence of parent, teacher, and community resources on the diagnosis and treatment of ADHD. Respondents also provided information on patient and stimulant prescription volume and referral patterns related to ADHD care.

The survey included multiple response formats: demographic and practice items were multiple-choice categorical answers and fill-in-the-blanks, whereas attitudinal questions were based on 5-point Likert scales of agreement. The frequency of diagnostic and treatment approaches were indicated as never, rarely, sometimes, or routinely. Data were recorded and stored using unique identification codes to maintain confidentiality. The Institutional Review Board of the University of Michigan Medical School approved all study activities.

We used STATA version 7.0 statistical software (Stata Corp, College Station, TX) to conduct all statistical analyses.¹⁵ First, we compiled univariate descriptive statistics for all measures. We then used Pearson χ^2 analysis to assess the association between guideline adherence and physician characteristics. For each guideline component, respondents who reported performing each measure routinely were compared with those who reported never, rarely, or sometimes. Finally, we performed multivariate logistic

regression modeling to analyze physician factors associated with a greater likelihood of reporting routine use of components of the AAP guidelines in daily clinical practice. Multivariate analyses were performed for the overall sample and for PDs and FPs separately to consider the confounding effects of physician specialty.

RESULTS

Sample

Of 1374 physicians in the sample, 166 were found to be ineligible (retired, do not see children, not in primary care, moved). For the remaining 1208 physicians, the overall response rate was 60% (723 of 1208), with 67% for PDs (405 of 608) and 53% for FPs (318 of 600).

Characteristics of respondents are presented in Table 1. The majority of physicians in our sample were male, working full-time, in a private group practice, and in practice >10 years. Differences between PDs and FPs were observed in the proportion of female and part-time physicians and in the proportion who had $\geq 40\%$ of pediatric patients in managed care or in Medicaid.

Physician-Reported ADHD Diagnostic and Treatment Approaches

The majority (67.5%) of primary care physicians evaluated >10 children for ADHD during the past year, and 7.9% of PDs reported evaluating >50 children for possible ADHD in the past year. Nearly every (97.8%) respondent had prescribed a medication for ADHD in the past year. Almost all (94.2%) respondents reported being the primary provider managing pharmacologic therapy, yet only a small number (13.9%) reported a major role in behavioral therapy or counseling.

Only 17.3% of respondents routinely referred their patients out of primary care for the initial evaluation and diagnosis of ADHD. When primary care providers made a referral, it typically was to psychologists/counselors/social workers (81.5%) or child psychiatrists/psychiatrists (55.1%); referrals were made less often to behavioral PDs (15.7%) or other primary care providers (7.0%).

Adherence to Guidelines

The majority (77.4%) of primary care physicians were familiar with AAP guidelines on ADHD, and many (61.1%) reported incorporating the guidelines into their practice. Overall, 91.5% of PDs were familiar with the guidelines, and 78.1% reported that they read and incorporated AAP guidelines into their practice. In contrast, 59.8% of FPs were familiar with the guidelines, and 39.0% reported having read and incorporated the AAP guidelines. The differences between PDs and FPs were statistically significant ($P < .001$).

Table 2 shows reported adherence to individual components of the guideline items for both diagnosis and treatment. The majority of respondents reported routine use of parent rating scales, teacher rating scales, and assessment for comorbidity. Far fewer physicians reported routine use of the *Diagnostic and Statistical Manual of Mental Disorders* criteria for di-

DIAGNOSTIC GUIDELINE MEASURES
<ul style="list-style-type: none"> • Clinician should use DSM criteria to determine diagnosis of ADHD • Assessment requires evidence directly obtained from parents/caregivers • Assessment requires evidence directly obtained from the classroom teacher • Evaluation should include assessment for coexisting conditions • Other diagnostic tests (<i>i.e.</i> bloodwork, CPT, EEG) are <i>not</i> routinely indicated to establish the diagnosis of ADHD <p><u>Sample Survey Item:</u></p> <p>“How frequently have you used Diagnostic & Statistical Manual of Mental Disorders (DSM) criteria in the evaluation and work-up of a child aged 6-12 with possible ADHD and no other complicating factors?”</p>
TREATMENT GUIDELINE MEASURES
<ul style="list-style-type: none"> • Clinician should recommend stimulant medication and/or behavior therapy • Appropriate target outcomes should be specified to guide management • If one stimulant fails to work at the highest feasible dose, clinician should recommend another • If a treatment failure occurs, clinician should reassess the diagnosis and treatment plan • Clinician should periodically provide systematic follow-up and monitoring <p><u>Sample Survey Item:</u></p> <p>“Please indicate how frequently you recommend each of the following management strategies (medication, behavior therapy/counseling) for children aged 6-12 with an established diagnosis of ADHD.”</p>

Fig 1. Selected AAP guidelines and sample survey items.

agnosis. Consistently, more PDs than FPs reported routine use of all diagnostic components specified in the guidelines. When we analyzed data for adherence to multiple components, only 34.9% of PDs and 14.3% of FPs reported routine use of all 4 diagnostic components in the survey.

The AAP guidelines specify that certain diagnostic tests should not be ordered routinely in the evaluation of children with suspected ADHD. Survey results were generally consistent with the guidelines in this domain; routine use was reported by only 9% of PDs and FPs for continuous performance testing and by <1% of PDs and FPs for neuroimaging/electroencephalogram. Laboratory tests (eg, thyroid, lead, or iron testing) were performed more commonly, with 18.1% of PDs and 39.6% of FPs reporting rou-

tine use. The difference was statistically significant ($P < .001$).

With regard to ADHD treatment, the majority of respondents reported routine recommendation of pharmacotherapy, titration of medications, and follow-up visits. Patterns of specialty differences were less consistent for treatment components: PDs were more likely to recommend medications, but FPs reported more frequent follow-up evaluations for children who receive medications. There were no specialty differences in recommendations for behavioral therapy.

Attitudes and Beliefs Regarding ADHD Care

The final portion of the survey assessed physician attitudes and beliefs regarding factors that may in-

TABLE 1. Primary Care Physician Characteristics

Respondent Characteristics	Family Physicians (%; n = 318)	Pediatricians (%; n = 405)	P Value
Male gender	71.9	52.9	<.001
In practice >10 y	64.0	64.8	.838
Part-time practice	14.1	24.7	<.001
See >50 pediatric patients per week	10.6	92.4	<.001
Behavioral/mental health training/fellowship	1.6	2.3	.537
Solo practice	19.5	16.3	.267
Practice type/ownership			
Private	67.1	59.2	
HMO	4.8	1.6	
Hospital	20.1	30.4	.003
Academic	6.5	5.8	
Public	1.5	2.9	
Large percentage (≥40%) of pediatric patients in managed care	19.2	40.3	<.001
Large percentage (≥40%) of pediatric patients in Medicaid	6.7	14.4	<.001

HMO indicates health maintenance organization.

TABLE 2. Reported Adherence to Guideline Components

Guideline Component	Overall Adherence	Family Physicians (%; n = 318)	Pediatricians (%; n = 405)	P Value
Diagnosis (% who routinely)				
Use parent rating scales	70.4	61.6	77.0	<.001
Use teacher rating scales	78.6	70.8	84.4	<.001
Assess for coexisting conditions	69.5	68.3	70.4	.588
Use DSM criteria	44.4	30.0	55.4	<.001
Treatment (% who routinely)				
Recommend medications	66.6	59.2	72.2	.001
Titrate medications when used, with follow-up <1 mo	81.3	81.7	80.9	.796
Evaluation of medications 3–4 times/y	53.1	67.5	41.6	<.001
Reconsider diagnosis if no response to 2 or more medications	51.9	46.3	56.4	.011
Recommend behavior therapy	53.4	53.2	53.6	.925

DSM indicates *Diagnostic and Statistical Manual of Mental Disorders*.

fluency ADHD diagnosis and treatment. A small but substantial proportion (20.4%) of respondents believed that parents are reluctant to accept a diagnosis of ADHD or that parents “don’t want to use medication” in ADHD treatment (14.2%). However, these beliefs showed no statistical association with routine use of parent rating scales in diagnosing ADHD, prescription of stimulant medications, or recommendation of behavioral therapy.

Many (55.3%) respondents agreed that teachers pressure them to diagnose ADHD and expect them to use medication for ADHD management (71.3%). There was, however, no statistical association between beliefs about teacher expectations and routine use of teacher rating scales in diagnosing ADHD or prescription of stimulant medications.

With regard to community influences, 43.9% agreed that “misuse of stimulants and other prescription medications is a concern in my community”; in bivariate analysis, physicians with this belief also reported less frequent recommendation of medication for ADHD (58.0% vs 72.5%; $P < .001$). Only 32.5% of respondents agreed that their community has adequate, accessible mental health resources. Physicians did not believe that stigma was a major barrier to care; only 12.4% reported that members of their community are less likely than those in other Michigan areas to seek care for mental health needs. Half (50.1%) of the physicians agreed that insurers limit coverage for assessment and treatment of ADHD. However, in bivariate analyses, attitudes

regarding community resources and access to mental health care were not significantly associated with ADHD diagnosis or treatment practices.

Multivariate Results

Multivariate analysis was used to examine physician factors that predict reported physician incorporation of AAP guidelines into clinical practice. Results are shown in Table 3. After controlling for physician variables of gender, years in practice, additional behavioral training, practice ownership, percentage of practice in managed care, and percentage of practice in Medicaid, PDs were still more likely than FPs to report reading and incorporating AAP guidelines on ADHD into their practice (odds ratio:

TABLE 3. Likelihood of Incorporating AAP Guidelines Into Practice

	Odds Ratio	95% CI
PD	5.4	2.6–11.0
Additional behavioral/psychiatric training	4.2	0.8–22.1
Male gender	0.8	0.5–1.3
>10 y in practice	0.8	0.5–1.3
Solo practice	0.5	0.3–0.9
Full-time practice	0.7	0.4–1.3
Academic practice	1.3	0.6–3.0
Volume of patients (>50/wk)	1.0	0.5–2.0
High (>40%) managed care	0.9	0.7–1.2
High (>40%) Medicaid	1.0	0.7–1.3

CI indicates confidence interval.

5.4; 95% confidence interval: 2.6–11.0). The only other physician or practice variable that was significant in the model was being in solo practice, which was associated with lower likelihood of incorporating AAP guidelines (odds ratio: 0.5; 95% confidence interval: 0.3–0.9). No other factors were significant in additional analyses (data not shown) of separate PD and FP subsamples that examined potential confounding by physician specialty.

DISCUSSION

Our study shows that many primary care physicians have read and integrated into their practices the AAP guidelines for diagnosis and treatment of ADHD. The majority of PDs and FPs reported adhering to recommended components of the guidelines for ADHD diagnosis—use of parent and teacher rating scales and assessment of comorbidity. In addition, primary care physicians reported ADHD treatment practices that are consistent with guidelines—use of stimulants and/or behavioral methods for treatment, close titration and monitoring of medications, and reevaluation if treatment is not successful.

These data provide some reassurances that the AAP guidelines have been disseminated and ADHD care reported by primary care physicians is generally in agreement with evidence-based practices. However, there are some differences between guideline recommendations and physician practices that require consideration. The majority of physicians still do not routinely use *Diagnostic and Statistical Manual of Mental Disorders* criteria in the diagnostic process. In addition, a moderate proportion of physicians indicated using diagnostic tests specified by the AAP as “not recommended,” including diagnostic laboratory tests and continuous performance testing. This finding suggests the potential for overutilization of diagnostic tests and has important implications for delivering appropriate and cost-effective care. Finally, when multiple guidelines were analyzed in combination, only a minority of primary care physicians reported routine use of all diagnostic and treatment practices.

We found variations between PDs and FPs in reported adherence to recommended diagnostic practices. Such variation has been previously described, with the suggestion that the mix of services for children with ADHD may be determined by the type of treating physician rather than by established standards of care.¹ Our finding that PDs were more likely than FPs to have read and incorporated AAP guidelines may account for some of this difference. In addition to printed guidelines, other efforts by the AAP, such as chapter efforts, continuing medical education meetings, and online quality improvement initiatives (eg, Education in Quality Improvement for Pediatric Practice) may have variable impact on different specialties. It is expected that PDs would be more inclined to follow guidelines developed by the AAP and disseminated vigorously throughout the pediatric community. Previous work has shown that physicians are more likely to report familiarity with and greater confidence in guidelines that are devel-

oped by their own specialty organizations.^{16,17} Additional attention should be given to wider and more deliberate dissemination of those practice guidelines that affect all primary care providers.

In addition to lack of awareness, there are multiple potential reasons for lack of adherence to guidelines: disagreement with recommendations, lack of physician self-efficacy, and other significant barriers such as reimbursement for services.¹⁷ Responses to items on potential service delivery barriers support factors such as lack of accessible mental health services and insurance coverage as important issues that many clinicians face across all specialties.

Although these results contribute to our understanding of the current reported primary care practices in ADHD care, several limitations must be noted. First, our sample includes only primary care providers in Michigan; thus, our results may not be generalizable to other regions. Second, our study assessed primary care physicians' reported diagnostic and treatment practices. Previous studies have demonstrated that physician self-report can over- or underestimate actual practice, when compared with confirmation methods such as chart audit or patient surveys.^{18,19} Additional confirmation of actual practice patterns for children with ADHD is necessary to validate physician-reported data. Finally, our study focuses on physician knowledge, beliefs, and practices for ADHD care. However, we need to consider contributions and perspectives of other providers, teachers, parents, and children themselves in the processes of care. Additional study on the role of school-based educational and counseling services should explore potential burdens and demands on services outside of the medical system.

This initial investigation found that most respondents provide care consistent with recommended practices. However, the guidelines are general and broadly defined in several areas, including the identification process and long-term management of ADHD. The process of identification for children with suspected attention problems is still largely unexplored. These important antecedent steps leading up to the diagnosis of ADHD are critical to a full understanding of practice and specialty variations. On the other side of the process, ADHD is a chronic condition; however, little attention has been paid to the ongoing evaluation and long-term treatment of children and adolescents. Even the AAP committee that developed the guidelines noted that insufficient evidence exists to guide follow-up and long-term care for ADHD.²⁰

In conclusion, our results suggest that primary care physicians are generally following evidence-based clinical practice guidelines for the care of children with ADHD, with differences by physician specialty, practice type, and other factors. Additional study is needed to examine the relationship between variations in care and clinical outcomes to determine what constitutes high-quality, long-term management of this chronic condition. Finally, we must continue to monitor practices as new treatment options and evidence emerge for school-aged children and

other important groups such as preschoolers and adolescents.

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