

Commentary**Clinical Practice****Evaluating and Treating ADHD in Primary Care Settings with Updated AAP Guidelines**Raymond R. Chankalal, M.D., M.Sc.¹Rebecca S. Daily, M.D.²¹University of Kansas School of Medicine-Wichita

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The decision of primary care providers to initiate treatment for attention-deficit/hyperactivity disorder (ADHD) in child and adolescent populations is a difficult choice that will be encountered often. ADHD is the most chronic health condition affecting school-aged children, with a prevalence of 8% in children and youth.^{1,2} Beyond academic underachievement and increased risk for accidental injury, children with ADHD may experience troublesome interpersonal relationships with family members and peers that contribute to the development of low self-esteem. More importantly, children left untreated for ADHD are at risk of developing substance abuse. Assessment, management, and treatment of ADHD can improve the educational and psychosocial development of most afflicted children and youth.^{3,4}

The American Academy of Pediatrics (AAP) recognizes that younger ages, coexisting conditions, and other concerns make the decision to treat increasingly pertinent, yet difficult for outpatient providers to perform.⁵ Specifically, intellectual disability, autistic spectrum disorder, moderate to severe sensory deficits, and physical, emotional, or sexual abuse, represent patient populations that would benefit from specialist referral or collaboration (see Table 1). There is also a high prevalence of coexisting conditions such as Oppositional Defiant Disorder (ODD) (35%), mood disorder (18%), anxiety disorder (25%), and learning disabilities (12-60%), which require evaluation, but do not preclude treatment for ADHD if diagnostically present.⁶

The aim of this article is to provide a synopsis of the recommended changes and process of care algorithm developed by the AAP Subcommittee on Attention-Deficit/Hyperactivity Disorder, Steering Committee on Quality Improvement and Management, recently developed to streamline the diagnosis and treatment of ADHD by either family physicians or pediatricians on an outpatient basis.⁵

Table 1. Coexisting conditions to be aware of when evaluating and diagnosis ADHD.

	Mood and Behavior	Physical	Developmental	Situational
Coexisting Conditions	Anxiety	Sleep Disorder	Learning Disorder	Adjustment
	Depression	Seizure Disorder	Language Disorder	Abuse
	Oppositional Defiance Disorder	Tics Disorder	Autism Spectrum	Stress
	Conduct Disorder	Hearing Deficits	Intellectual Disorder	Substance

Guideline Revisions

Previously, the American Academy of Family Physicians (AAFP) had utilized the set of guidelines established by the AAP for assessment and diagnosis of school-aged children with ADHD, most recently from 2001.⁶ The former recommendations were applicable to an age range from six to twelve years, meeting the criteria of ADHD according to DSM-IV-TR,⁷ evident in various settings documenting the degree of functional impairment, core symptoms and duration, assessment for coexisting conditions, and diagnostic tests not routinely indicated for diagnosis of ADHD but helpful with evaluation for comorbid disease.⁶ The recommendations have been updated by the Subcommittee which is comprised of the AAP in collaboration with a subcommittee made up of primary care and developmental behavioral pediatricians, members of the American Academy of Child and Adolescent Psychiatry, Child Neurology Society, Society for Pediatric Psychology, National Association of School Psychologists, the Society for Developmental and Behavioral Pediatrics, the American Academy of Family Physicians, Children and Adults with Attention-Deficit/Hyperactivity Disorder, along with epidemiologists from Center for Disease Control and Prevention.⁵ Most noteworthy is the effort given to provide evidence based updates to the guidelines focusing on current treatment approaches, safety concerns, and practicality in a busy outpatient setting. The key action statements are summarized below in Table 2. The key action statements of the new guidelines⁵ are:

- Evaluation for any patient, 4-18 years of age, who has symptoms suggestive of ADHD is strongly recommended (quality of evidence B).
- The DSM-IV-TR⁷ criteria for ADHD, regardless of subtype, must be satisfied based on reports from two settings, usually parents and teachers (strongly recommended; quality of evidence B).
- Assessment for coexisting conditions including physical, behavioral, developmental, and situational (stress, adjustment, abuse) is strongly recommended (quality of evidence B).
- Perception of ADHD must recognize affected patients as having special health care needs that qualifies as a chronic condition (strongly recommended; quality of evidence B).
- Age specific treatments exist, specifically preschool children, 4-5 years of age. Receive behavioral therapy as first line treatment is strongly recommended (quality of evidence A) while possible use of US Food and Drug Administration (FDA) approved medications is recommended (quality of evidence B). Elementary-aged children 6-11 years of age receive FDA-approved medications for treatment of ADHD (strongly recommended; quality of evidence A), along with parent and/or teacher administered behavioral therapy (quality of evidence B). Adolescents 12-18 years of age receive FDA-approved medications for treatment of ADHD (strongly recommended; quality of evidence A) and behavioral therapy is recommended (quality of evidence C).
- Primary care physicians should titrate FDA approved medications for treatment of ADHD to maximize benefits yet minimize adverse effects (strongly recommended; quality of evidence B).

Process-of-care Algorithm

The AAP has set forth a treatment and assessment algorithm to streamline the decision making process when working with school aged children with concerns of ADHD, with a summary provided in Figure 1. The sentiments of the process-of-care algorithm are paraphrased in Table 3. Of importance, the process outlined in the algorithm is not intended to be completed in one office visit, but correct application depends on the provider experience and comfort level,

Table 2. Strongly recommended key action statements for the new guidelines regarding evaluation, diagnosis, and treatment of ADHD, except for behavioral therapy in ages greater than 11 years, which is recommended with a quality of evidence C.

	Key Statement of Guideline	Additional Consideration
Expanded Age Range	Evaluation and treatment of ADHD is expanded to ages 4-18 years old, no longer limited to 6-12 years old.	ADHD must be diagnosed before 7 years, unless history prior to cutoff reveals symptoms fulfilling criteria for diagnosis.
Diagnostic Criteria	Identification of DSM-IV-TR ⁷ symptoms reported from two settings (parents and teachers).	Ensure validated DSM-IV-TR ADHD rating scales are utilized; consider mood and behavioral disturbances along with substance use.
Coexisting Conditions	Appropriately screen for conditions that coexist with ADHD (e.g., ODD, Tourette's).	Assess physical, behavioral, developmental, and situational conditions.
Clinical Perception of ADHD	Youth and children with ADHD have special health care needs.	Management of ADHD patients should follow the principles of the chronic care model and the medical home.
Age Determines First Line of Treatment	Children less than 6 years old: behavioral treatment and possible FDA-approved medication.*	First line medication is methylphenidate, with patient appropriate formulation.
	Children 6-11 years old: FDA-approved medication and behavioral treatment.	Second line medication is atomoxetine.
	Children and adolescents older than 11 years: FDA-approved medication and possible behavioral treatment.	Third line and adjunctive treatments include guanfacine ER and clonidine ER.
Titrate ADHD approved Rx for maximal benefit but minimize ADRs	70% of ADHD patients respond with continued systematic trials of different therapies given adequate titrations over 3 to 7 days prior to changing agents.	Headaches, reduced appetite, decreased sleep, and reduced growth velocity in first two years. Rare risk of sudden cardiac death. Guanfacine has risk of hepatitis.

*Decision to utilize FDA-approved medications in preschool children depends on severity of ADHD symptoms and duration.

existing office resources and infrastructure acquainted with mental health surveillance and screening.⁸ All aspects of the diagnostic and treatment procedures must be documented in the patient's chart along with the use of rating scales at baseline to assess response to medications and provide objective reports to parents.⁹ In the Subcommittee's development of the process-of-care algorithm for the assessment, diagnosis, and treatment of ADHD, occasionally there was

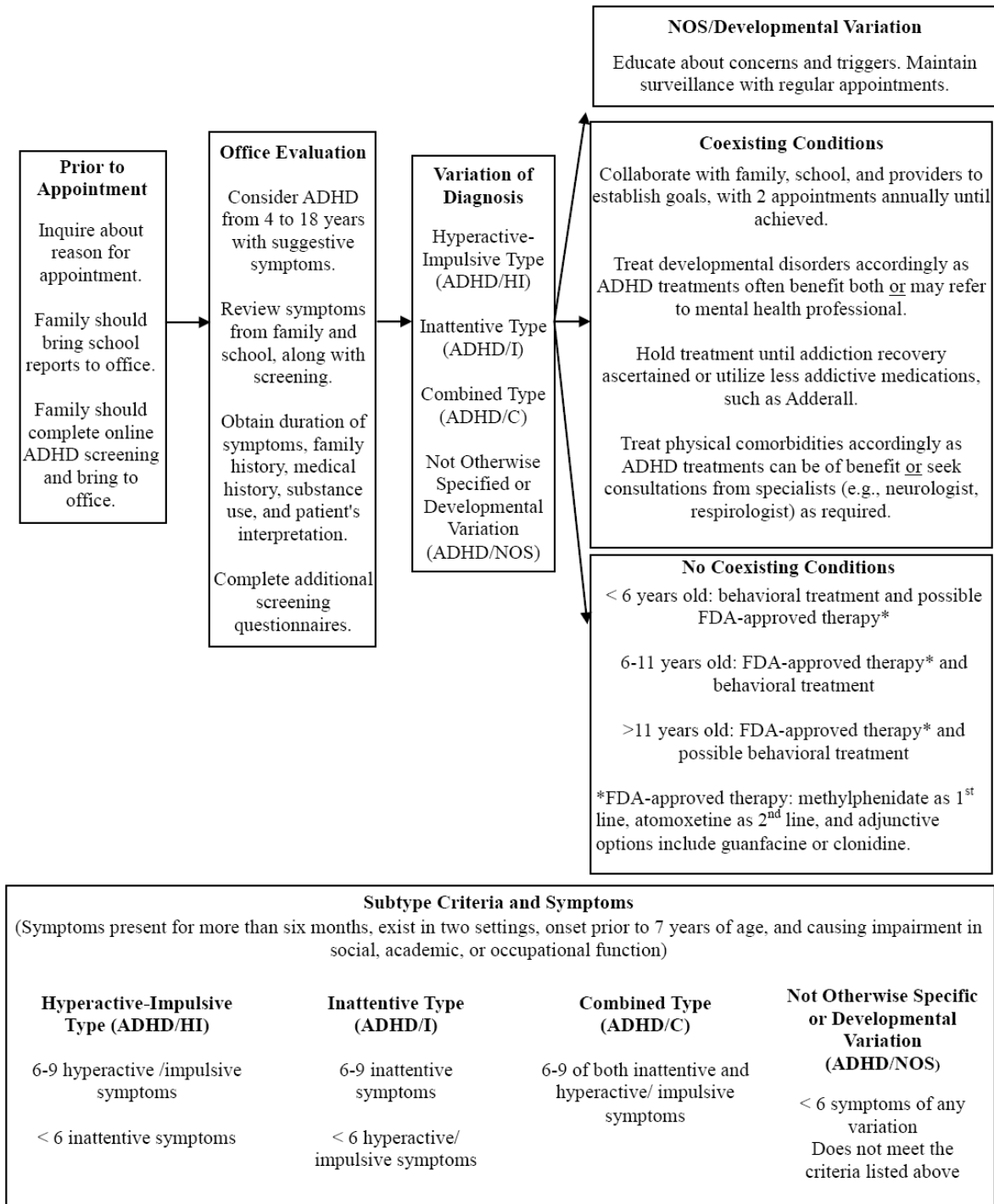


Figure 1. Modified ADHD process-of-care algorithm from the AAP.⁹

insufficient evidence based data to support parts of the approach but these were supplemented with the utilization of expert opinion.⁵

In a sensitive manner, office staff is recommended to inquire about the chief complaint to set an appointment that provides adequate time and resources to optimize the encounter. Prior to

Table 3. Outline of ADHD process-of-care algorithm from the AAP.⁹

Step	Recommended Approach
Before Appointment	Identify reasons for appointment and schedule adequate time. Pre-exam questionnaires by patient, teachers, and parents. Obtain consent for school data, reports, etc.
Evaluation	Consider ADHD in any patients 4 to 18 years old with symptoms. History from family and teachers, with validated ADHD scales. History to include: onset and duration of symptoms, past medical, family, psychosocial, coexisting conditions, substance abuse, and report of function. Interview patient to determine their self-impression of function; observe their mood symptoms and behaviors, and to assess neurological function. Administer self-report instrument of ADHD in adolescents.
Diagnosis	6-9 inattentive symptoms and < 6 hyperactive/impulsive symptoms suggestive of ADHD/I (inattentive type). 6-9 hyperactive/impulsive symptoms and < 6 inattentive symptoms suggestive of ADHD/HI (hyperactive-impulsive type). 6-9 symptoms of both inattentive and hyperactive/impulsive is suggestive of ADHD/C (combined type). Less than 6 symptoms and/or failing to satisfy below criteria is suggestive of ADHD/NOS or Developmental Variation. Symptoms need to be present > 6 months, must be present in two settings, must be present prior to age of 7, and must coincide with significant impairment in social, academic, or occupational functioning.
No Coexisting Conditions	Treat according to guidelines based on patient's age.
Coexisting Conditions	Establish management team with collaboration with family, school, child, and other health care providers to establish treatment goals and strategy, with follow-up a minimum of twice a year once goals obtained. Developmental concerns may be treated depending on provider level of comfort, as both can improve with therapy, or referral for collaboration with mental health professional can be beneficial Behavioral or situational concerns may be treated depending on provider level of comfort, as both can improve with therapy, or referral for collaboration with mental health professional can be beneficial. Hold treatment for coexisting substance use until addiction recovery is ascertained <u>or</u> utilize less addictive medications such as adderall. Physical co-morbidities may be treated depending on provider level of comfort <u>or</u> seek consultation from neurology or respirology as required.
Developmental Variation	Provide education regarding concerns and triggers; maintain surveillance with regularly scheduled appointments.

attending the first appointment to assess for ADHD, parents should be asked to complete questionnaires regarding symptoms and level of functional impairment, obtain information from academic settings such as report cards, standardized testing, and psychoeducational assessments, along with signing consent for primary treatment teams to obtain and share information with academic institutions.⁹ Evaluation is required in any patient ages 4 to 18 years of age with symptoms suggestive of ADHD. Evaluation requires obtaining functional history of impairment from two settings, commonly parents and teachers, with use of validated ADHD scales whenever possible. These parties also should assist in provision of medical, family, developmental, psychosocial, and substance abuse history. To assess for coexisting conditions in adolescents, it is essential to be conscious of mood disorders, psychosocial stressors, or neurological conditions, and obtain the patient's self-impression, sometimes requiring the use of self-reported instruments.

In diagnosis of ADHD, the presence of core symptoms is essential.⁹ The presence of 6-9 hyperactive/impulsive symptoms and less than six inattentive symptoms are required for ADHD/Hyperactive/Impulsive (HI) subtype diagnosis. The presence of 6-9 inattentive symptoms and less than six hyperactive/impulsive symptoms are required for ADHD/Inattentive (I) subtype diagnosis. Finally, the presence of 6-9 symptoms of both hyperactive/impulsive and inattentive features is indicative of ADHD/Combined (C) subtype. If there is presentation after age 7, years without symptoms in the history before this age, the duration of symptoms is less than six months, these features are not observed in two settings, or these symptoms do not provide functional impairment, then the diagnosis of ADHD cannot be made and the term of Developmental Variation is applied.⁹ If there is the presence of less than six symptoms of either subtypes or the patient fails to meet the qualifier remarks above, then the diagnosis of ADHD/NOS may be applied. Table 4 includes a list of ADHD subtype symptoms based generated from the DSM-5.¹⁰ Screening for coexisting conditions may be positive which could warrant the referral to appropriate services should the primary team feel uncomfortable treating ADHD under such circumstances. Beyond physical contributors such as hearing deficits or seizure, ADHD treatment may preclude treatment of anxiety or depression as these disorders often benefit from this approach.

Discussion

The new treatment guidelines⁵ are an extension of the previous action statements in 2001⁶, but have utilized evidence based material to update these practices and provide more guidance for practitioners in a demanding outpatient setting. There will be features of the new guidelines that may generate questions from family and providers; however, it is essential to consider the long term outcomes of untreated ADHD. Parents of young children may have concerns regarding the assessment and possible treatment of ADHD in preschool age ranges, but there is evidence to support the early presentation and the acute benefits of treatment.^{11,12} For providers, it is important to note that most patients with ADHD will not display core symptoms during physical and mental status examinations placing significant weight on the description of features by family and teachers.¹³ It is critical that screening for addiction be conducted and that appropriate treatment be provided prior to the management of ADHD.¹⁴ To avoid long term consequences of ADHD, the chronic care model suggests ongoing care along with bidirectional communication with teachers, other mental health professionals, and the parents; an approach that has been validated in asthma patients.^{15,16}

Table 4. ADHD subtype symptom requirements * adapted from DSM-5.¹⁰

Hyperactive/Impulsive	Inattentive
Fidgeting	Seems not to listen
Unable to remain seated	No sustained attention
Runs or climbs in inappropriate settings	Poor attention to details or careless mistakes
Difficulty with leisure activities	Fails to finish tasks
Seems to be “On the go”	Poor organization
Talks excessively	Avoids tasks requiring attention
Blurts out answers	Loses things for tasks
Unable to wait turn	Easily distracted
Interrupts or intrudes on others	Forgetful

*Symptoms must have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level. Symptoms must occur prior to age 7 years and must occur in two settings. The disturbance must cause clinically significant distress or impairment in social, academic, or occupational functioning.

The major concern with lack of treatment is the long term risks of poor academic achievements, inability to build beneficial relationships, poor executive function throughout life, substance abuse, and decreased self-esteem with risk of mood disorders.⁹ Methylphenidate is strongly recommended with a quality of evidence A, followed by atomoxetine, extended release guanfacine, and extended release clonidine, in that order, with strong recommendation and the quality of evidence A.⁵ Dextroamphetamine is the only ADHD medication approved for use in patients less than 6 years of age with insufficient evidence for safety, while there are more clinical studies with methylphenidate suggesting efficacy and safety.^{5,17} Treatment of preschool children with FDA-approved medications has been targeted toward patients with moderate to severe ADHD that has persisted more than nine months, has been refractory to behavioral therapy, all of which has been observed in two or more settings.¹⁷ A referral to a specialist for treatment of preschool children with moderate to severe symptoms would be reasonable should the primary care provider feel it warranted. Children of preschool ages have lower rates of metabolism thus lower dosages are recommended with regular titration as necessary. Guanfacine ER and clonidine ER are the only two medications that are FDA approved for adjunctive therapy in children 6 to 17 years old.^{18,19}

Common adverse effects of medication approved for ADHD include headache, decreased appetite, sleep disturbance, and decreased growth velocity of about 1-2 cm on average.²⁰ There can be psychosis and hallucination with stimulant use, a rare occurrence, with one study showing a 1.48% rate of incidence.²¹ In patients younger than 6 years of age, there are reports of greater mood lability and dysphoria.¹⁷ Although there are case reports of stimulant-induced cardiovascular effects,²² along with the non-stimulant drug-induced myocardial infarction,²³ ADHD specialists from the European ADHD Guidelines Group, the European Network of Hyperkinetic Disorders, and pediatric cardiovascular specialists came to the conclusion that the

overall risk of sudden death in young individuals using ADHD medications does not exceed that of the general population.²⁴ Children who suffer from ADHD had changes in heart rate variability that benefit from stimulant treatment.²⁵ Overall, most reports in children and adolescents indicated rare occurrence of stimulant-induced cardiovascular adverse effects.²⁶ The effect of stimulant use on sleep is not straightforward as it is multifactorial that includes the subtype of ADHD, the patient's pretreatment sleeping habits, the type of medication utilized, along with the duration, frequency, and formulation of the medication.²⁷ The most common adverse event with stimulant medication is delayed sleep onset latency that ranges from 30 to 50 minutes depending on the agent utilized.^{28,29}

Behavioral modification therapy often helps parents and teachers devise reward systems that encourage desired behavior along with elimination of unwanted traits.³⁰⁻³² Beyond assisting parents to modify the home environment to benefit the child, it also builds parental awareness of triggers and helps children/patients regulate their own behaviors.⁵ The long term effects of behavioral therapy remain to be evaluated but incorporation of such strategies is essential under the chronic care model.³³ Despite mixed reviews on the combined efficacy of medications and behavioral therapy, there is certainty that lower dosages are required, thus reducing the risk of adverse effects.³⁴

Ultimately the evaluation, diagnosis, and treatment of ADHD will be conducted by outpatient providers and the aim of the new guidelines, and this article, is to assist these treatment teams in such roles. There continues to be shortcomings based on limited information such as long term effects of medications in preschool populations, comparisons of different medications in the different age ranges, validated diagnostic tools, effectiveness of collaborative efforts, timelines for follow-ups, and approaches to increase adherence to treatments.⁵ However, there are advancements emerging such as computer aided evaluations³⁵ along with off label administration of safety established neurological agents, which could aid substantially in the diagnosis and treatment of ADHD.^{36,37} More recently, electroencephalographic (EEG) studies showed fronto-central theta-to-beta band activity ratios that displayed consistent abnormalities in patients with ADHD.³⁸ Such neuro-feedback studies have shown application to ADHD in young adult populations.³⁹ Meta-analyses showing EEG to have some prognostic utility⁴⁰ leading the FDA to approve this three dimensional approach as a conjunctive tool in the diagnosis of ADHD in patients 6 to 17 years of age.⁴¹

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