

## **\*Notice\***

Medication tables #2 and #3 in this document have been revised. The formatting has been improved for ease of use and readability.

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Please notify clinicians and staff who may have downloaded this guideline before the above date of the availability of the corrected guideline.

# **Diagnosis and Management of Attention Deficit Hyperactivity Disorder in Primary Care for School-Age Children and Adolescents**

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**Eighth Edition  
March 2010**

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- physicians, nurses, and other health care professional and provider organizations;
- health plans, health systems, health care organizations, hospitals and integrated health care delivery systems;
- health care teaching institutions;
- health care information technology departments;
- medical specialty and professional societies;
- researchers;
- federal, state and local government health care policy makers and specialists; and
- employee benefit managers.

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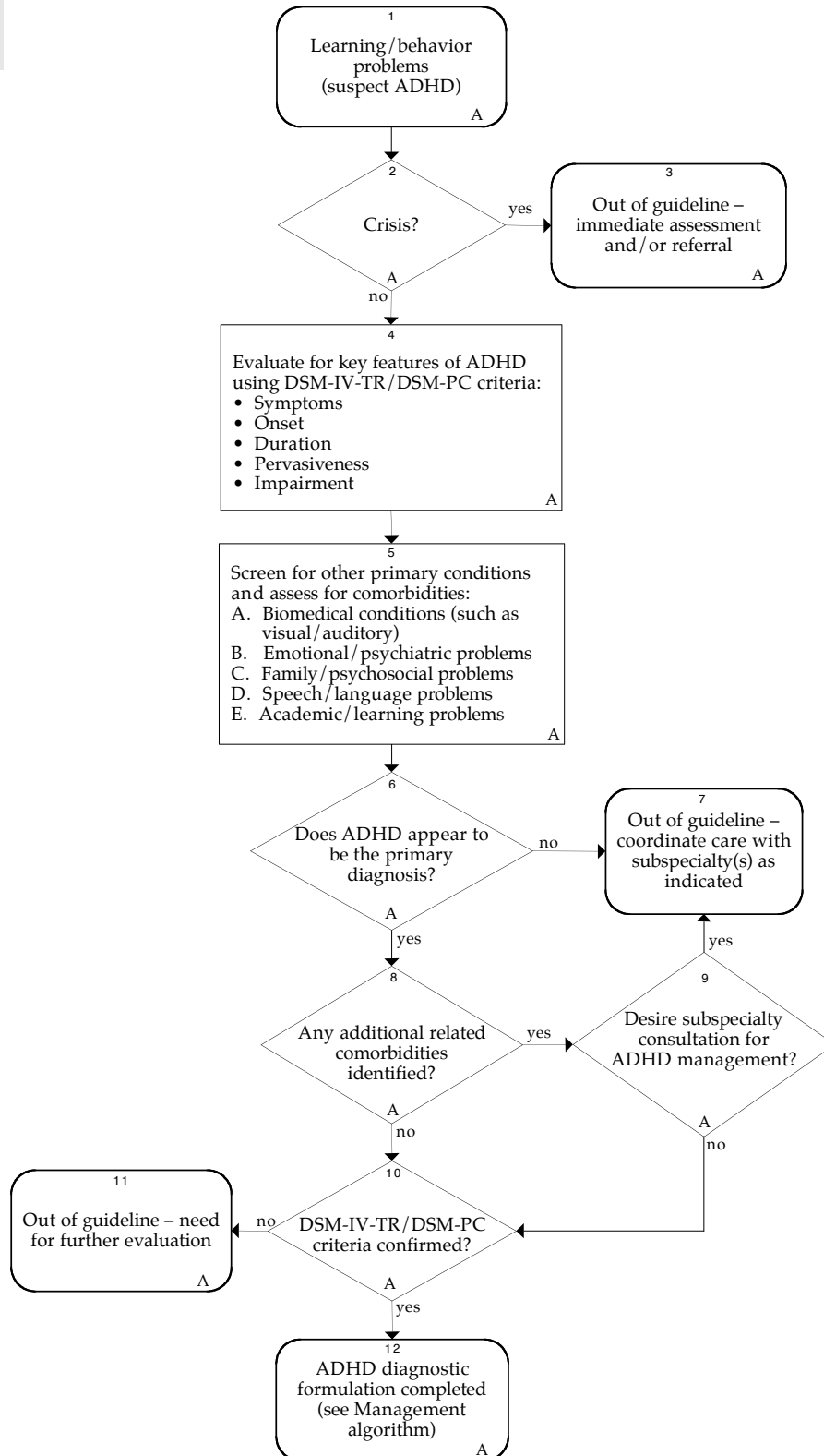
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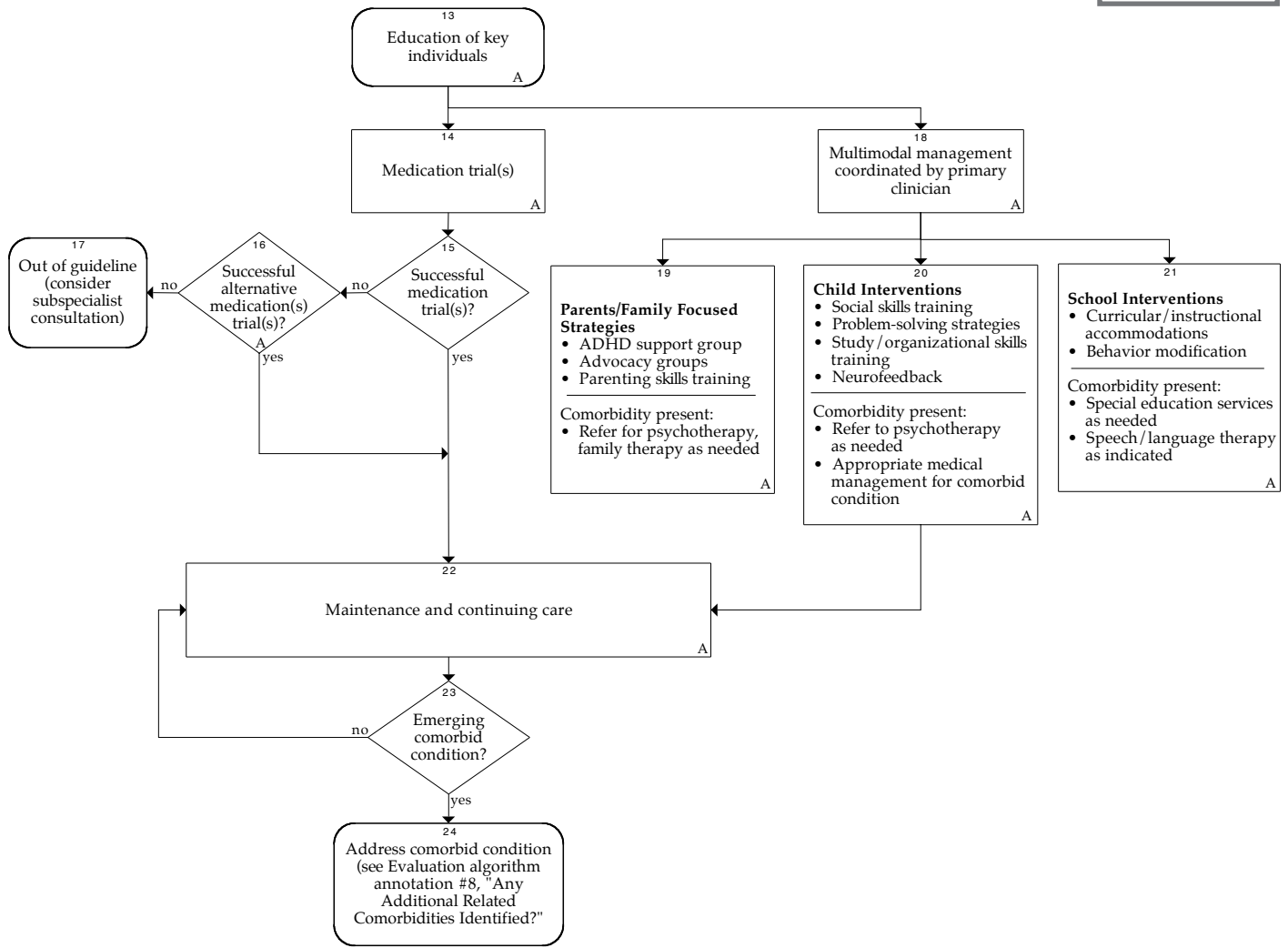
**Evaluation Algorithm**

A = Annotation



# Management Algorithm

A = Annotation



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# Foreword

## Introduction

Attention deficit hyperactivity disorder (ADHD) is a high prevalence condition with many potential medical, emotional-behavioral, social and academic consequences for a child or adolescent. In addition, its presentation to the primary care clinician may range from straightforward to very complex. The guideline work group feels that many patients presenting with learning or behavior problems and suspected of ADHD can be adequately evaluated and managed in the primary care setting, allowing for subspecialty or multidisciplinary consultation in more complex cases. It also recognizes the need for variable implementation models depending on specific medical, mental health, and educational systems to ensure accuracy of diagnosis and appropriateness of management.

This guideline is intended to provide information helpful to the primary clinician. Details in the annotation section are provided for this purpose; however, it is recognized that the degree of usefulness for each clinician will vary according to each individual's experience with and prior knowledge of ADHD.

It is expected that the primary care clinician making the initial diagnosis of attention deficit hyperactivity disorder will not only evaluate the primary symptoms described in the DSM-IV-TR or DSM-PC criteria, but also will screen for other primary conditions and comorbidities using multiple data sources. Some patients will require further specialized evaluation based on information learned in this process. From these findings the primary clinician may choose to manage the patient or to utilize subspecialty consultation for ADHD management. It should be understood that at any point within the evaluation or management algorithm, the primary clinician may choose to seek subspecialty consultation from various disciplines.

The overall goal of this guideline is to ensure that all patients diagnosed with ADHD are accurately evaluated and appropriately managed, whether by the primary clinician or through subspecialty consultation.

## Scope and Target Population

This guideline pertains to diagnosis and management of attention deficit hyperactivity disorder in the primary care setting for children and adolescents from kindergarten through 12th grade.

## Clinical Highlights and Recommendations

- Evaluate children/adolescents suspected of having ADHD based on DSM-IV-TR/DSM-PC diagnostic criteria using consistent and appropriate diagnostic tools. (*Annotation #4; Aim #1*)
- Screen all patients for other primary conditions or comorbidities and appropriately refer to subspecialty consultation for further evaluation. (*Annotation #5; Aim #2*)
- Establish appropriate use of medications in both initial and ongoing management of patients with ADHD. (*Annotation #14; Aim #3*)
- As with many conditions, ADHD is rarely a singular diagnosis. Multimodal intervention is commonly needed for other concomitant conditions and comorbidities. (*Annotation #18*)
- Provide consistent and comprehensive monitoring and care coordination for all patients with ADHD including pharmacologic and non-pharmacologic interventions, identification and management of emerging comorbidities, and the impact of ADHD condition on patients, their families and schools. (*Annotation #22; Aims #3, 4*)

## Priority Aims

1. Increase the use of DSM-IV-TR or DSM-PC criteria and screening for diagnosing attention deficit hyperactivity disorder. (*Annotation #4*)
2. Increase screening for other comorbidities in patients newly diagnosed with attention deficit hyperactivity disorder. (*Annotation #5*)
3. Improve the primary care use of FDA-approved ADHD medications with indications for management of patients with ADHD. (*Annotation #14*)
4. Improve primary care communication with parents and school in treatment planning for children with ADHD. (*Annotations #19, 21*)

## Key Implementation Recommendations

The following system changes were identified by the guideline work group as key strategies for health care systems to incorporate in support of the implementation of this guideline.

1. Evaluation for key features of ADHD using the DSM-IV-TR/DSM-PC criteria should include information from multiple sources such as parents/caregivers, the child and school personnel, and should be documented in the patient medical record.
2. Results of the evaluation are critical to identify appropriate treatment options and resources.
3. Develop processes that allow for consistent documentation and monitoring of diagnosis and management of ADHD.
4. Develop a process for follow-up assessment and success in management of ADHD for primary care provider, parents and school.
5. Develop a process for consistent documentation and monitoring of medication.
6. Develop a process to key the primary care physician at the time of or near puberty that anticipatory guidance and transition into adulthood discussion should take place.

## Related ICSI Scientific Documents

There are no other ICSI guidelines whose scope and/or recommendations are closely related to the content of this guideline at this time.

## Disclosure of Potential Conflict of Interest

ICSI has adopted a policy of transparency, disclosing potential conflict and competing interests of all individuals who participate in the development, revision and approval of ICSI documents (guidelines, order sets and protocols). This applies to all work groups (guidelines, order sets and protocols) and committees.

Participants must disclose any potential conflict and competing interests they or their dependents (spouse, dependent children, or others claimed as dependents) may have with any organization with commercial, proprietary, or political interests relevant to the topics covered by ICSI documents. Such disclosures will be shared with all individuals who prepare, review and approve ICSI documents.

Judson Reaney, MD received consulting and speaker fees from Shire USA and Eli Lilly.

No other work group members have potential conflicts of interest to disclose.

## Introduction to ICSI Document Development

This document was developed and/or revised by a multidisciplinary work group utilizing a defined process for literature search and review, document development and revision, as well as obtaining input from and responding to ICSI members.

For a description of ICSI's development and revision process, please see the Development and Revision Process for Guidelines, Order Sets and Protocols at <http://www.icsi.org>.

## Evidence Grading System

### A. Primary Reports of New Data Collection:

- Class A: Randomized, controlled trial
- Class B: Cohort study
- Class C: Non-randomized trial with concurrent or historical controls  
Case-control study  
Study of sensitivity and specificity of a diagnostic test  
Population-based descriptive study
- Class D: Cross-sectional study  
Case series  
Case report

### B. Reports that Synthesize or Reflect Upon Collections of Primary Reports:

- Class M: Meta-analysis  
Systematic review  
Decision analysis  
Cost-effectiveness analysis
- Class R: Consensus statement  
Consensus report  
Narrative review
- Class X: Medical opinion

Citations are listed in the guideline utilizing the format of (*Author, YYYY [report class]*). A full explanation of ICSI's Evidence Grading System can be found at <http://www.icsi.org>.

## **DSM-IV-TR/DSM-PC Criteria for ADHD**

### **Attention Deficit Hyperactivity Disorder (ADHD)**

A. Either (1) or (2):

1. Six or more of the following symptoms of inattention have persisted for at least six months to a degree that is maladaptive and inconsistent with developmental level:

**Inattention**

- a. Often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities
- b. Often has difficulty sustaining attention in tasks or play activities
- c. Often does not seem to listen when addressed directly
- d. Often does not follow through on instructions and fails to finish schoolwork, chores or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
- e. Often has difficulty organizing tasks and activities
- f. Often avoids, dislikes or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
- g. Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books or tools)
- h. Is easily distracted by external stimuli
- i. Is often forgetful in daily activities

2. Six or more of the following symptoms of hyperactivity-impulsivity have persisted for at least six months to a degree that is maladaptive and inconsistent with developmental level:

**Hyperactivity**

- a. Often fidgets with hands or feet or squirms in seat
- b. Often leaves seat in classroom or in other situations in which remaining seated is expected
- c. Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults may be limited to subjective feelings of restlessness)
- d. Often has difficulty playing or engaging in leisure activities quietly
- e. Is often "on the go" or often acts as if "driven by a motor"
- f. Often talks excessively

**Impulsivity**

- g. Often blurts out answers before questions have been completed
- h. Often has difficulty awaiting turn
- i. Often interrupts or intrudes on others (e.g., butts into conversations or games)

- B. Some hyperactive-impulsive symptoms or inattentive symptoms that caused impairment were present before age seven years.
- C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).
- D. There must be clear evidence of clinically significant impairment in social, academic or occupational functioning.
- E. The symptoms do not occur exclusively during the course of a pervasive developmental disorder, schizophrenia or other psychotic disorder, and are not better accounted for by another mental disorder (e.g., mood disorder, anxiety disorder, dissociative disorder or personality disorder).

**DSM-IV-TR/DSM-PC Criteria for ADHD**

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**Code based on type:**

- 314.00 **Attention Deficit Hyperactivity Disorder, Predominantly Inattentive Type:** If criterion A(1) is met but criterion A(2) is not met for the last six months.
- 314.01 **Attention Deficit Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type:** If criterion A(2) is met but criterion A(1) is not met for the last six months.
- 314.01 **Attention Deficit Hyperactivity Disorder, Combined Type:** If both criterion A(1) and criterion A(2) are met for the last six months.

Coding note: For individuals (especially adolescents and adults) who currently have symptoms that no longer meet full criteria, "In Partial Remission" should be specified.

- 314.9 **Attention Deficit Hyperactivity Disorder Not Otherwise Specified:** This category is for disorders with prominent symptoms of inattention or hyperactivity-impulsivity that do not meet the criteria for attention deficit hyperactivity disorder.

# Algorithm Annotations

## Evaluation Algorithm Annotations

### 1. Learning/Behavior Problems (Suspect ADHD)

#### **Key Points:**

- Children may be referred for evaluation of learning problems, behavior problems or specifically ADHD.
- The intensity and prominence of individual ADHD symptoms vary in relation to a child's age, developmental stage and academic level.

Children may be referred for an ADHD evaluation by a variety of individuals for a variety of reasons. ADHD can present in many fashions either at home or in the school setting. Furthermore, presenting symptoms may vary depending on the age of the child, evolve predictably with development, and change relative to academic demands at different grade levels. Although the core symptoms of inattention, impulsivity and hyperactivity are characteristic, their severity and pattern are highly variable across individuals.

#### **Some possible presenting problems identified by parents:**

- Noncompliance
- Aggression
- Anger management problems
- Impulsivity
- Engaging in physically dangerous activity
- Task completion difficulty
- Disorganized, messy
- Appearing "spaced out" or "zoned out"
- Mood lability
- Absentmindedness
- Social/emotional "immaturity"
- "Hyper," "in constant motion"

#### **Some possible presenting problems identified by school personnel:**

- Hyperactivity
- Fidgety, restless behavior
- Inattention, off-task behavior, distractibility
- Social interaction problems (impulsivity and intrusiveness)
- Underachievement, school failure
- Disruptive classroom behavior

## Algorithm Annotations

- Talks excessively, blurting out answers
- Doesn't listen well
- Incomplete, missing homework
- Messy, disorganized work

### Some possible presenting problems identified by children/adolescents:

- Dislike of school
- Lack of close or long-term friendships
- Frustration with certain teachers or subjects
- Excessive conflict with parents
- Low self-esteem

The developmental changes in the characteristic symptoms of ADHD over time influence the presenting symptom profile (*Werry, 1992 [R]*). For example, problems with excessive motor behavior tend to decrease with increasing age, and there is commonly spontaneous improvement in attention with advancing development, as well. Environmental demands and changes, evolving social roles and associated problems such as poor self-image, antisocial behavior, and learning difficulties also have an influence on the ongoing course and prominence of certain symptoms.

DSM-IV-TR/DSM-PC-based field trial data suggest that in the preschool age group, the hyperactive/impulsive subtype predominates, with the comorbid combined type being seen most often in the school-age child (*Applegate, 1997 [C]*).

The impact of ADHD symptoms on functioning of individuals in the adolescent age group can be particularly confusing (*Barkley, 1990b [B]; Reiff, 1998 [R]*). Not uncommonly, the hyperactivity/impulsivity dimension diminishes with age. Behavioral manifestations of ADHD in adolescence include insatiability and restlessness, behavioral impulsivity, risk-taking behaviors, low self-esteem, weak reinforcibility, loss of motivation, social failure, antisocial behavior, alcohol or drug abuse, motor vehicle accidents, and school drop-out. ADHD may impact the academic performance of the adolescent, with associated difficulties such as memory problems, cognitive fatigue, fine motor dysfunction, or ineffective self-monitoring resulting in "careless" errors, performance inconsistency, task impersistence, and inattention to detail.

## 2. Crisis?

Although the initial concern may be presented as ADHD, one must be able to rule out a crisis that requires immediate attention and that precludes the initiation of the guideline.

Because ADHD is not seen as a crisis, it is important to ask questions that rule out an immediate need for attention. Crisis management should be dealt with immediately. Although ADHD may also be present, it can be evaluated at a later date.

These questions can be answered in an office visit, by phone call or other means of encounter.

### A. Life Threatening

- Is there a threat of suicide?
- Is there a threat of harm/violence to others?
- Is there a threat of violence/abuse to the child?

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B. Life Disruptive

- Is there a threat of school expulsion?
- Is there a threat of arrest/legal action?

**3. Out of Guideline – Immediate Assessment and/or Referral**

This may vary depending on available resources and the location of the patient at the time of the crisis. For example: appointment with mental health provider, social services, physician or 911.

**4. Evaluate for Key Features of ADHD Using DSM-IV-TR/DSM-PC Criteria**

**Key Points:**

- Evaluation of primary symptoms should include information from multiple sources such as parents/caregivers, the child and school personnel.
- Three subtypes of ADHD are described based on the predominance of presenting symptoms: Predominantly Inattentive Type, Predominantly Hyperactive-Impulsive Type, Combined Type.
- Criteria related to age of onset, duration, pervasiveness of symptoms, and impairment should be considered in establishing the diagnosis of ADHD.

Attention deficit hyperactivity disorder (ADHD) may have an impact on a child's/adolescent's experience within school, family, play or work. Approximately 8.7% of children ages 8-15 met DSM-IV criteria for ADHD in the National Health and Nutrition Examination Survey (NHANES) (Froehlich, 2007 [D]). It is a chronic condition that may be variably expressed depending on the child's environment, as well as on the specific demands placed upon the child within that environment. The DSM-IV-TR/DSM-PC classifies ADHD into three subtypes depending on the prevalence of specific behaviors: Predominantly Inattentive, Predominantly Hyperactive/Impulsive, and Combined Types.

The evaluation of primary symptoms should include information from multiple sources such as parents, the child and school personnel. A comprehensive interview with parents or caregivers – including current symptoms and their previous history, past medical and developmental history, school and educational history, and family and psychosocial history – is most important. There is no single evaluation tool available to make a definitive diagnosis of ADHD. The diagnosis is based on a clinical picture of early onset, significant duration and pervasiveness, and causing functional impairment within the life of the child or adolescent. This can be facilitated through the use of a semistructured interview or questionnaire, with behavior rating scales completed by the parents, other caregivers and school personnel.

**Suggested Behavior Rating Scales:**

**Vanderbilt ADHD Diagnostic Rating Scale (Wolraich, 2003 [C])**

- Can be scored with ADHD-IV norms
- Screens for comorbid conditions
- Normed by age and sex
- Separates inattention and hyperactive/impulsive factors
- Can be used free of charge

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**ADHD-IV Rating Scale** (ADHD Rating Scale – IV: Checklists, Norms, and Clinical Interpretation by George J. DuPaul, Thomas J. Power, Arthur D. Anastopoulos, and Robert Reid, 1998)

- Based on DSM-IV-TR/DSM-PC criteria for ADHD
- Normed by age and sex
- Separates inattention and hyperactive/impulsive factors
- Can be used free of charge

**Child Attention Profile** (*Barkley Clinical Interview* by Barkley RA in Attention Deficit Hyperactivity Disorder: a Clinical Workbook, 1991).

- Based on inattention and overactive items from the Achenbach Child Behavior Checklist
- Normed by sex
- Separates inattention and overactive factors
- Can be used free of charge

**Conners Parent and Teacher Rating Scale** (*Conners, 1998a [C]; Conners, 1998b [C]*)

- Multiple scales assessing conduct, learning, psychosomatic, impulsive/hyperactive, and anxiety dimensions
- Some concern present over few items focusing on cognitive (inattention) versus behavioral (hyperactive/impulsive) features of ADHD.
- Can be used for a fee

Numerous other rating scales are available that are multidimensional but more complex to score and interpret. They are not often used in primary care, but providers should be familiar because they will get them from specialists, schools, etc.

- Achenbach Child Behavior Checklist (CBCL)
- Teacher Report Form (TRF)
- Youth Self-Report
- Devereaux Scales of Mental Disorders (DSMD)
- Behavioral Assessment System for Children (BASC)

These may be helpful in evaluation of comorbid conditions (*Cantwell, 1996 [R]; DuPaul, 1992 [C]; Eiradi, 2000 [C]; Lahey, 1994 [C]; Matier-Sharma, 1995 [C]*).

Please refer to Annotation #5, "Screen for Other Primary Conditions and Assess for Comorbidities."

The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (Text Revision)* (DSM-IV-TR) is recognized as the most widely used resource for diagnosis of mental disorders, including ADHD (*American Psychological Association, 2000 [NA]*). Alternatively, a manual designed for use in primary care practice, the *Diagnostic and Statistical Manual for Primary Care (DSM-PC): Child and Adolescent Version*, is now available. The DSM-PC is designed to bridge the gap between pediatric primary care and mental health services. It contains the DSM-IV-TR criteria for childhood mental health disorders including ADHD and related conditions, but also contains useful information on the developmental continuum of behavior, from normal variations to mental disorders. It is fully compatible with the DSM-IV-TR manual but provides a vocabulary that primary care providers may find more useful to describe mental health, behavioral and devel-

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opmental phenomena seen in their daily practices. The DSM-PC Child and Adolescent Version describes ADHD and related disorders under the section heading "Impulsive/Hyperactive or Inattentive Behaviors." It also provides a section on differential diagnosis and related conditions (pp. 93-110) (*Wolraich, 1996a [R]*).

**Symptoms**

ADHD is categorized by the following core symptoms:

- Inattention
- Hyperactivity
- Impulsivity

Please refer to DSM-IV-TR/DSM-PC criteria (included after the algorithms) for specific behavioral symptoms.

There are three subtypes of the disorder based upon the "often" occurrence of at least six of nine behaviors within the inattention dimension, and six of nine behaviors within the combined hyperactivity/impulsivity dimension:

- Predominantly inattentive type (meeting criteria for the inattention dimension)
- Predominantly hyperactive/impulsive type (meeting criteria for the hyperactive/impulsive dimension)
- Combined type (meeting criteria for both dimensions)

**Onset**

Some behavioral symptoms typically have begun prior to the age of seven years in most children (see DSM-IV-TR/DSM-PC criteria). These symptoms may not be obvious in children who are predominantly inattentive without significant hyperactivity or impulsivity. Previous history must be reviewed carefully, especially in older children and adolescents, for the presence of symptoms not previously recognized or identified.

**Duration**

The presence of behavioral symptoms is typically of long duration (at least six months, see DSM-IV-TR/DSM-PC criteria) and previously recognized by parents, teachers or the patient. Careful review of previous symptoms is critical for evaluation of the presence or absence of symptoms not otherwise identified by parents, school personnel or other caregivers. It is also helpful to assess the characteristics of previous observers with respect to the validity of information (e.g., specific teacher qualities, home and classroom environment).

**Pervasiveness**

Due to the relationship of ADHD symptoms to the external environment, specific interest and motivation, individual demands on attention and focus, and day-to-day influences, there can be significant variability within a given child. Nevertheless, ADHD behaviors are typically present in more than one setting (e.g., home, school, play or work; see the DSM-IV-TR/DSM-PC criteria).

**Impairment**

ADHD symptoms present in varying degrees of severity and impairment, depending upon individual characteristics and demands. It is important to assess the degree of impairment as the ADHD symptoms relate to the child's or adolescent's social, academic or family functioning (see DSM-IV-TR/DSM-PC criteria).

A word about behavior rating scales:

At least one standardized rating scale is recommended for reviewing observations from those persons in direct contact with the child/adolescent (parents, day care providers, teachers, etc.) These observations/ratings should be used as part of the overall historical data base and should not be the sole criteria used to include or exclude the diagnosis of ADHD. Caution should be used in interpreting these due to observer bias, threshold of problem identification, and lack of observer knowledge (especially true of older children/adolescents in middle or upper grades).

A word about continuous performance tasks:

Various continuous performance tasks (CPTs) have been developed to attempt to objectively measure sustained and selective attention, for example, Test of Variables of Attention (TOVA), Gordon Diagnostic System and Conners CPT. These tasks involve the rapid presentation of stimuli where subjects are asked to respond to specific targets. The results measure certain variables of attention related to errors of omission and commission. Although these instruments appear to discriminate between children with ADHD and their normal counterparts at a group level, the usefulness of these measures in assessing individual children is limited. Due to significant false negative rates (estimated at 15-30%), these instruments are not considered pathognomonic of ADHD and are of limited utility in screening and evaluation. They are most useful in research settings and the complex individual patient where more extensive data may be useful.

## 5. Screen for Other Primary Conditions and Assess for Comorbidities

### Key Points:

- Many children can exhibit symptoms of ADHD at some point in their development, but it is important to note that common symptoms (inattention, hyperactivity, disruptive behavior, academic difficulty) can be caused by a number of other difficulties.
- Children who have attention problems represent a very diverse, heterogeneous population and exhibit a broad range of symptom severity and a wide range of associated diagnoses.

Many children can exhibit symptoms of ADHD at some point in their development, but it is important to note that common symptoms (inattention, hyperactivity, disruptive behavior, academic difficulty) can be caused by a number of other difficulties. At this stage of the process the clinician must consider diagnoses other than ADHD in one of two paradigms. Some patients will meet the criteria for ADHD but will also have a **comorbid diagnosis or diagnoses ("primary ADHD" with comorbidity)**. Other patients will have a diagnosis other than ADHD that largely accounts for the behavioral symptoms of inattention, impulsivity and/or hyperactivity. The latter instance can be conceptualized with an **alternative diagnosis as "primary" with secondary features that mimic ADHD** (Barkley, 1990a [C]).

Children who have attention problems represent a very diverse, heterogeneous population and exhibit a broad range of symptom severity and a wide range of associated diagnoses. Comorbidities that are common in children with ADHD include oppositional defiant disorder (54%-84%), smoking (19%), language or learning disorder (25%), anxiety (up to 33%), and depression (up to 33%) (American Academy of Child and Adolescent Psychiatry, 2007 [R]). Because of this extensive comorbidity, the evaluation of children referred for problems with attention, impulse control or hyperactivity should include biobehavioral, developmental, psychological, psychosocial, educational and speech/language components.

If issues comorbid to ADHD are not identified and addressed, they may complicate and worsen the child's level of functional impairment and lead to higher morbidity with a poorer prognosis. Research suggests

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that ADHD subgroups might be delineated based on patterns of comorbidity. These distinct subgroups may have different clinical courses, pharmacologic responses and risk factors. Proper identification of comorbid conditions can lead to appropriate refinements in treatment planning.

One way to get at comorbidity is by using standardized screening instruments such as the Child Behavior Checklist. It is important to note that this instrument serves a screening function and is not meant to be diagnostic for any specific condition. Training is recommended to effectively and appropriately score and interpret these instruments. Other, more specific, instruments including the Children's Depression Inventory, the Revised Children's Manifest Anxiety Scale and the Academic Performance Rating Scale may best be utilized in consultation with a qualified mental health professional.

Differentiating ADHD from an alternative primary condition such as oppositional-defiant disorder, generalized anxiety disorder, or a specific learning disability can be difficult even for seasoned clinicians (*Biederman, 1991 [R]; Biederman, 1992 [R]; Cantwell, 1987 [R]*). Therefore the diagnosis of ADHD should be applied with care and caution, only after an appropriately thorough evaluation.

In screening children and adolescents for other diagnoses, it is important to emphasize the need to include information from as many sources as possible: the patient, parents, teachers, coaches and health care professionals.

Screening patients for other diagnoses falls into the five basic domains defined in A-E of this annotation.

There are a number of possible strategies to consider in the comprehensive screening of the ADHD patient for other problems. One is for the primary care provider to utilize his or her ongoing familiarity and relationship with the family and patient over time to get a sense of any primary or comorbid problems identifiable in the five areas defined in A-E of this annotation.

A second strategy would be to use a semistructured interview format with some "key" questions designed to get at the disorders identified in the five domains described in Annotation #4 (symptoms, onset, duration, pervasiveness and impairment).

Another strategy includes the use of "screening" questionnaires that, although not diagnostic, can offer a general sense of potential areas for concern. Examples of utilized instruments are the **Achenbach Child Behavior Checklist (CBCL)**, **Teacher Report Form (TRF)**, **Youth Self-Report**, **Devereux Scales of Mental Disorders (DSMD)**, and the **Behavioral Assessment System for Children (BASC)**. These forms are scored across a number of behavioral domains. Clients who receive scores above a certain cutoff point in any given domain might then be considered for more intensive evaluation around that problem area. Using the instrument properly requires some training. Consultation with a psychologist for assistance in interpretation may be helpful. For additional information, please refer to Annotation #4, "Evaluate for Key Features of ADHD Using DSM-IV-TR/DSM-PC Criteria."

(*Reiff, 1998 [R]*)

For those patients suspected of other conditions or comorbidities, continued assessment is necessary to confirm or exclude such conditions. In these cases further investigation, including subspecialty consultation, may be needed.

**Table 1: Differential Diagnosis and Assessment of Comorbidity in Children with ADHD**

Biomedical Problems
Perinatal complications
Neurological (e.g., Tourette's syndrome, seizure disorder)
Chromosomal abnormality (fragile X syndrome)
Metabolic/Endocrine (e.g., hypothyroidism)
Toxins/medications (e.g., lead)
Iron deficiency
Sensory impairment
Chronic illness
Sleep disorder
Emotional/Psychiatric Problems
Developmentally normal variation
Anxiety disorder
Depression/dysthymia/childhood mania juvenile bipolar disorder
Pervasive developmental disorder/Autism
Oppositional defiant disorder/Conduct disorder
Substance abuse
Adjustment disorder
Psychosis
Family/Psychosocial Problems
Disruptive/Chaotic home environment
Mismatch of behavioral style and environmental expectations
Family stresses/Transitions
Abuse/Neglect
Cultural factors
Parental psychopathology and/or chemical dependency
Social skills deficits
Speech/Language Problems
Expressive/Receptive language disorder
Phonological disorder
Dysfluency
Apraxia
Central auditory processing disorder
Academic/Learning Problems
Cognitive impairment
Specific learning disability
Giftedness
Other learning style variations and dysfunction (e.g., memory, auditory discrimination problems)

**A. Biomedical Conditions**

**Key Points:**

- A health history and a physical/neurological/developmental assessment are necessary to identify or rule out problems in the biomedical realm of the ADHD differential diagnosis.

## Algorithm Annotations

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- Based on the history and physical examination, further workup may be indicated in areas such as genetic or chromosomal, neurological or biomedical conditions.

Note: The screening for the five domains will provide data to suspect a differential diagnosis or data to suspect a diagnosis of ADHD.

A health history and a physical/neurological/developmental assessment are necessary to identify or rule out problems in the biomedical realm of the ADHD differential diagnosis. Deficits in sensory areas (e.g., hearing and vision) may result in classroom difficulties and produce restless or inattentive behaviors. Children with neuromaturational delays or neurological "soft signs" are at risk for learning and behavioral disorders (*Kelly, 1992 [R]; Murphy, 1992 [R]; Wender, 1995 [R]*).

### **General Health History and Physical Examination, Including:**

- Growth parameters: height, weight
- Vital signs: blood pressure, pulse
- Screening of vision and hearing
- History of prematurity (*Delobel-Ayoub, 2009 [B]*)

Special emphasis on:

- Overall physical appearance
  - Minor physical anomalies may signal genetic abnormalities (low-set ears, large or undescended testicles, high-arched palate, etc.)
- Signs and symptoms of abuse
- Neurological examination
  - Abnormalities (e.g., motor or vocal tics, asymmetry or abnormality of reflexes or motor tone, tremors)
  - "Soft signs"

Subtle neurological signs including difficulty with sequencing, dysrhythmia, mirroring, motor overflow, and clumsiness. "Clumsiness" refers to the performance of fine and/or gross motor tasks in an immature, slow, irregular or inconsistent fashion. Skills are imprecise rather than grossly impaired. "Soft" neurological signs are present in many children with learning and behavioral disorders.

- Assessment of developmental status
  - Observation of child's activity level in examination room, ability to converse appropriately, ability to follow directions, and cooperativeness
  - History of delays or questionable areas:
    - Auditory perception
    - Expressive language
    - Visual and sequential processing
    - Memory
    - Fine and gross motor function

## Algorithm Annotations

- Cognitive screening tools

The provider may find the following helpful. Responses are age dependent.

- Ask the child to tell about a recent event – birthday, sports event, etc. (Note whether language is fluent, coherent and organized.)
- Ask parent if child has difficulty taking telephone messages or retaining classroom instructions, if age appropriate. (short-term memory)
- Observe the child using a pencil to copy symbols and words. (visual perceptual-motor)
- Ask the child to perform a three-step command. (sequencing)
- Ask the child to repeat four words, remember them and repeat them again when asked in 5 or 10 minutes. (memory, attention)
- Ask the child to repeat three, then four digits forward; then repeat three, then four digits backward. (concentration)

Based on the history and physical examination, further workup may be indicated in areas such as:

- Genetic or chromosomal
  - Fragile X syndrome
  - Mental retardation
  - Tourette's syndrome
  - Neurofibromatosis
- Neurological
  - Seizure disorder
  - Choreiform disorder
  - CNS trauma
  - Neurodegenerative conditions
  - CNS infection
- Biomedical
  - Toxins (lead, fetal alcohol syndrome, prenatal cocaine exposure)
  - Allergy
  - Auditory or visual impairment
  - Metabolic/endocrine
  - Anemia
  - Sleep disorders may lead to behaviors that may mimic mild ADHD, and exacerbate symptoms of moderate to severe ADHD (*Chervin, 2002 [D]; O'Brien, 2003 [C]*). Sleep should be thoroughly evaluated.

## B. Emotional/Psychiatric Problems

### Key Points:

- Children with ADHD have increased risk for depression, anxiety disorders, conduct disorder and substance abuse.
- Clinicians should screen for these comorbid conditions during the interview with all ADHD patients.
- Children with autism spectrum disorders may present with ADHD symptom features, but the ADHD symptoms are thought to be part of the autism spectrum disorder. The clinician may still choose to treat the ADHD symptoms. (Autism treatment is out of guideline.)

**Algorithm Annotations**

The diagnosis of ADHD may be complicated by either the presence of another coexisting psychiatric condition or the existence of a psychiatric condition that has symptoms suggestive of the diagnosis of attention deficit hyperactivity disorder. It is clear that children with attention deficit hyperactivity disorder are at risk for the coexistence of depression, anxiety disorders, conduct disorders and substance abuse. The prevalence of these conditions in children with ADHD ranges from 15 to 30 percent. At the same time it is those same four diagnostic entities that may most often be misdiagnosed as ADHD due to the commonality of many of the symptoms. Therefore, it behooves the clinician to screen for those four conditions when evaluating a child for whom the diagnosis of ADHD is being considered (*Biederman, 2008 [C]; Faraone, 1997 [C]; Geller, 2002 [C]; Giedd, 2000 [R]; Jensen, 1997 [C]; Spitzer, 1994 [R]; Werry, 1987 [C]; Wozniak, 1995 [C]*). If the clinician identifies sufficient positive symptomology after completion of these screening questions to raise the clinical suspicion of a psychiatric diagnosis, referral to a mental health professional is indicated.

The following may be considered as a starting point in evaluating the possible presence of depression, anxiety disorders, conduct disorders and substance abuse.

**Depression**

- Consistent depressed or irritable mood nearly every day that has lasted for at least two weeks
- Significantly diminished interest or pleasure in all or almost all activities
- Undeniable decline in school or work performance
- Recurrent suicidal ideation without a specific plan, or recurrent thoughts of death
- Persistent depressed mood associated with almost daily insomnia or hypersomnia

**Childhood Mania-Juvenile Bipolar Disorder**

Recent experience suggests an overlap between ADHD and juvenile mania-bipolar disorder. Children with bipolar and comorbid ADHD presented with a predominantly irritable phenotype and predominately chronic course (*Masi, 2006 [D]*).

The following are characteristics of childhood mania that may aid the clinician in differentiating the two conditions:

- Mania juvenile bipolar disorder is episodic and extremely rare when compared to ADHD.
- Patient experiences pressured speech, racing thoughts, grandiosity, reduced need for sleep.
- Symptoms include rapid onset affective storms, prolonged severe temper outbursts, violent furious aggression, irritability, erratic interpersonal behavior.
- Usually mixed presentation with depression.
- Strong family history of bipolar disorder.

**Anxiety Disorder**

The diagnosis of post-traumatic stress disorder, which falls under the anxiety spectrum, may be the most common diagnosis that mimics ADHD. The most likely areas of posttraumatic stress disorder are those that fall in the spectrum of physical or sexual abuse. Those areas should have been screened by taking a psychosocial history as part of the overall assessment. The remaining diagnoses that are likely to present themselves in childhood include those of separation anxiety disorder and generalized anxiety disorder. Screening that may be useful in identifying those conditions is listed below.

- Developmentally inappropriate and excessive anxiety concerning separation from home or from those to whom the child is attached.

## **Algorithm Annotations**

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- Persistent and excessive worry about losing or about possible harm befalling major attachment figures.
- Repeated complaints of physical symptoms when separation from major attachment figures occurs or is anticipated.
- Consistent excessive dissatisfaction with less than perfect performances (e.g., school assignments).
- Difficulty in controlling or stopping his/her own worrying/anxiety.

### **Conduct Disorder**

- Presence of negativistic, hostile and defiant behaviors that may include losing temper, arguing with adults, refusing to comply with adults' requests, deliberately annoying people, consistent anger and resentment expressed toward others.
- Presence of a history of physical aggression toward people or animals.
- History of deliberate involvement in theft from others.
- History of violation of rules with potential serious consequences (e.g., running away from home, truancy from school).

### **Substance Abuse**

- History of use of alcohol or illicit drugs of any kind.
- Use of alcohol or drugs to alter mood state or to escape a mood state.
- Consequences at school, in the home or with legal authorities related to the patient's use of alcohol or drugs.
- History of a peer expressing concern regarding the patient's use of alcohol or drugs.
- History of feeling guilty about use of alcohol or drugs.
- Behaviors suggestive of drug or alcohol use (increasing isolation from family/friends, presence of drug paraphernalia).

### **Pervasive Developmental Disorders** (e.g., autistic disorder, Asperger's syndrome)

Although it is uncommon for ADHD to be confused with autism spectrum disorders, it is not uncommon for children with autism spectrum disorders to present with ADHD features. Typical problem areas for these children include:

- qualitative impairment in social interaction (e.g., reciprocity, non-verbal gesture, sharing, peer relationships),
- qualitative impairment in communication (e.g., language delay, conversational speech, idiosyncratic/stereotyped language, symbolic/imitative play), and
- restrictive, repetitive patterns of behavior (e.g., preoccupations, rituals, self-stimulatory motor mannerisms).

## **C. Family/Psychosocial Problems**

### **Key Points:**

- Chronic or acute stress may cause changes in a child's academic or behavioral functioning, such as mimicking ADHD symptoms or exacerbating existing symptoms.
- Assess family history of mental illness. Subtypes of ADHD vary with type of mental illness in families.
- Assess the family's functioning in terms of the nature of the caregiver-child interactions, impact of symptoms within the home, and family resources for coping.

In addition to the evaluation of comorbid psychiatric or learning conditions, it is important to consider the psychosocial context in which the child's symptoms and concerns arise. Identified below are factors to consider and some ideas for interview questions. A thorough assessment of the family's functioning will assist in understanding both the nature and severity of the child's symptoms, and the family's ability to make use of education and treatment recommendations. If significant family pathology is present, then referral to a mental health professional, family therapist or social services is appropriate.

### **Psychosocial Stressors**

There is some evidence that children with ADHD and a concurrent depressive or anxious condition have higher levels of life stress and maternal psychiatric symptoms (*Jensen, 1993 [C]; Rostain, 1991 [R]; Simeon, 1993 [R]; Spencer, 1996 [R]*).

The experience of chronic or acute stress may manifest in a child's functioning in a variety of ways; common symptoms include anxiety, dysphoria, and behavioral acting out. Any of these difficulties may result in changes in academic performance or behavior in the home environment.

Sample question: Has your family been coping with other difficulties or stressors during the past year or two?

Stressful life events may include:

- major life transitions or changes (move, change of school),
- loss (death of loved one, parental separation or divorce),
- abuse (sexual or physical, domestic violence), or
- traumatic events (e.g., car accident).

### **Family History**

There is increasing recognition that the subtypes of ADHD vary not only in patterns of comorbidity, but also with respect to genetic family history. Family history data suggests more ADHD, aggression and substance abuse in families of children with ADHD hyperactive/impulsive subtype, whereas families of children with ADHD Inattention subtype have more anxiety disorders and learning problems (*Beiderman, 2008 [C]; Geller, 2007 [C]*).

Sample question: Has anyone in your family (parents, siblings and extended family) been treated for....?

- anxiety disorder;
- depressive disorders (including bipolar disorder);
- learning/attention problems;

## **Algorithm Annotations**

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- developmental delay, mental retardation, autism;
- chemical dependency;
- conduct problems; or
- other mental health problems.

### **Quality of Caregiving**

Consider the family's strengths and resources for coping, as well as their beliefs and attributions concerning their child's difficulties. Also examine the effects of the child's symptoms on the family as a whole.

Interview caregivers for evidence of family dysfunction or vulnerability. In particular, evaluate for problems that may affect the parents' ability to manage behavior consistently and appropriately, to provide adequate nurturance and structure, and to accurately (meaningfully) evaluate the child's functioning.

These problems may include:

- parental psychiatric disorder or chemical abuse/dependency,
- cultural differences,
- lack of education or information,
- low intellectual functioning,
- the absence of family/community supports,
- psychosocial stressors (see above), and
- limited nurturance of child.

Sample questions:

- What is a typical day like at your home?
- Do you feel supported by the child's school and the community?
- Who provides help with your child when you need it?
- Is there any use of alcohol or illicit drugs in your home?
- Can you tell me what you've heard or learned about ADHD?
- What kind of discipline works (or doesn't work) with your child?
- When do you enjoy being with your child?

## **D. Speech/Language Problems**

### **Key Points:**

- If screening indicates concerns about a child's speech and/or language – including expressive and receptive language, speech fluency, pragmatic language, prosody, or phonology/articulation – a referral should be made to a pediatric speech and language pathologist.
- Parents may make a request for speech screening in writing to their child's school, with a copy of the request kept by the parents. Alternatively, the family may seek a private speech and language evaluation. It is helpful for primary care providers to be familiar with speech and language pathology resources in their community in order to make appropriate referrals.

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- If speech and language problems suggestive of a pervasive developmental disorder are present, referral should be made to developmental or mental health professionals with a speech and language pathologist as a part of the diagnostic team.
- Children with ADHD are at higher risk for "vocal chord abuse." When a child is found to have a chronic raspy or hoarse vocal quality, a referral to an otolaryngologist is recommended to look for vocal cord pathology such as vocal cord thickening or vocal cord nodules.
- The presence of repetitive noises, throat clearing, sniffing, barking or coprolalia in a child with ADHD suggests comorbid Tourette's syndrome. A consultation by a pediatric neurologist, developmental and behavioral pediatrician, or child psychiatrist may be appropriate.

Deficits in verbal functioning may be chronic and are particularly common in adolescents with antisocial behavior. Any history of speech or language delay or services should be discussed and reviewed (*Cantwell, 1981 [D]; Giddan, 1991 [R]*). Common difficulties include:

- historical or current problems with dysfluencies;
- disorganized speech on tasks that require verbal explanations;
- excessive, tangential, or rapid speech;
- problems with volume modulation; and
- fragmented sentences with pauses.

Receptive language problems may also be present in children with ADHD or may be a comorbid condition. These children may mimic primary problems with attention and have problems following directions and retaining verbally presented material (*Cantwell, 1981 [D]; Giddan, 1991 [R]*).

Many children with ADHD manifest "pragmatic language dysfunction" in social situations – namely, an inability to read essential verbal, non-verbal and situational cues. This can lead to a tendency to make socially unacceptable choices. The clinician should inquire about evidence of aggressive, domineering and intrusive social interaction styles, as well as difficulty in initiating and maintaining friendships, or even outright rejection by peers.

If screening indicates concerns about a child's speech and/or language including expressive and receptive language, speech fluency, pragmatic language, prosody, or phonology/articulation, a referral should be made to a pediatric speech and language pathologist. Parents may make a request in writing to their child's school, with a copy of the request kept by the parents. Alternatively, the family may seek a private speech and language evaluation. It is helpful for primary care providers to be familiar with speech and language pathology resources in their community in order to make appropriate referrals.

Children with hearing impairments can also have ADHD exclusive of their hearing problems. This can be a complicated differential diagnosis, possibly requiring specialty referral (*Kelly, 1993 [R]*). Children with hearing impairment may also present with symptoms of inattention, problems with task completion, disruptive behavior, noncompliance, speech and language problems or a need for frequent repetition of information. If questions arise, they should be referred to an audiologist for formal evaluation.

Children with difficulties in the pervasive developmental disorder/autism spectrum can sometimes present with symptoms similar to ADHD. Identifying features of PDD/autism from the speech/language standpoint include:

- excessive self-talk,
- unusual intonation patterns or monotone,
- echolalia,

## Algorithm Annotations

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- acts as if didn't hear,
- socially inappropriate behaviors (e.g., screaming, interrupting), and
- loss of previously acquired language skills.

If speech and language problems suggestive of a pervasive developmental disorder are present, referral should be made to developmental or mental health professionals with a speech and language pathologist as a part of the diagnostic team.

Children with ADHD are also at higher risk for "vocal cord abuse," and therefore, voice quality (particularly "hoarseness") should be assessed. Children with evidence of vocal cord abuse (e.g., hoarseness of more than six months' duration) may need referral to an otolaryngologist to evaluate for vocal cord pathology such as vocal cord thickening or vocal cord nodules.

Patients with ADHD who have comorbid vocal tics or Tourette's may demonstrate speech patterns typical to this disorder including repetitive noises, throat clearing, barking or even coprolalia. A consultation by a pediatric neurologist, developmental and behavioral pediatrician, or child psychiatrist may be appropriate.

### **E. Academic/Learning Problems**

#### **Key Points:**

- Approximately 25% of children with ADHD also have language or "learning disorder" (*American Academy of Child and Adolescent Psychiatry, 2007 [R]*).
- Children with subnormal intelligence may appear inattentive due to a lack of understanding or comprehension of material; furthermore, these children are more likely than children of normal intelligence to have comorbid ADHD.
- If history and screening indicate significant concerns with academic functioning, the child should undergo individual cognitive/psychoeducational assessment.

The history should include information from parents and teachers to assess common performance areas of difficulty in children with ADHD, which include:

- completion of independent work in a timely fashion,
- attention to detail,
- studying for exams,
- taking notes on classroom lectures,
- organizational skills,
- time management, and
- self-monitoring.

Empirical evidence indicates a consistent relationship between ADHD and learning disorders. One in every three to four children with ADHD has a specific academic skill deficit or "learning disability" in a traditionally defined area such as reading, written language or mathematics. A learning disability is formally identified by comparing a student's IQ score to his or her scores in achievement areas and identifying a significant discrepancy (usually defined as 1.75 to 2 standard deviations) between the two.

Learning disabilities or disorders as currently defined in the DSM-IV-TR/DSM-PC include:

- reading disorder,
- mathematics disorder,

## Algorithm Annotations

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- disorder of written expression, and
- developmental coordination disorder.

Children with subnormal intelligence may appear inattentive, due to their lack of understanding of and tracking with material that is too difficult for them. However, it is also important to note that children with cognitive impairment are three to four times more likely to have ADHD than children with intelligence scores in the normal range. Therefore, an IQ assessment and individual achievement testing may often be essential components of an ADHD evaluation. It is important to note that these children may be misdiagnosed as having a primary attention problem when in fact their symptoms are secondary to an inappropriate level of difficulty or stimulation in academic programming.

It is important to review school concerns with the patient, parents, teachers and other school professionals. "Red flags" or common presenting symptoms of concern for children with learning disabilities or cognitive impairment could include:

- apparent apathy or hostility toward school;
- avoidance of or failure in specific subject areas;
- disruptive or negative behaviors in certain classes;
- historical evidence of difficulty in specific skill areas;
- history of special educational services, "Title 1" assistance, etc.; and
- history of early childhood service.

A sample of possible questions directed at children and their parents for assessing academic performance issues presenting in the context of an ADHD evaluation might include:

- What subject is your favorite/easiest?
- What subject is hardest/least favorite?
- How do you get along with your teachers?
- How much homework do you do on an average night? How does this compare to the amount of homework classmates are doing? How much do your parents help you with your homework?
- What grades are you receiving in each of your classes? How does this compare to your grades in previous years? Have you ever failed or are you currently failing any classes?
- Do you receive any special help in school?
- What are your interests outside of school?
- Does your son/daughter have any trouble with study/organizational skills?
- What do you see as your son/daughter's learning style strengths? Weaknesses?
- Do you think your child feels positively about school?
- Has anyone from school ever contacted you with specific academic or behavioral concerns about your child?
- Are you pleased with your child's grades?
- Do you feel your son/daughter is working up to his/her potential?

Students functioning at the "gifted" end of the cognitive spectrum may also manifest signs or symptoms of ADHD such as inattention, disruptive behavior, and apparent lack of motivation or engagement in classroom activities. It is important to note that these children can be misdiagnosed as having a primary attentional problem, when in fact their symptoms are secondary to the lack of an appropriate level of challenge and stimulation in academic programming. Giftedness and ADHD may coexist, however.

One of the goals of assessment is to determine whether a student's academic difficulties are due to ADHD, learning disabilities or both. A second question would be whether a student presenting with symptoms of ADHD actually has ADHD as the primary condition or whether a learning style issue (e.g., learning disability) might be sufficient to account for the identified problem behaviors. There is a significant overlap between populations of students with ADHD and those with academic skills deficits.

On average, students with ADHD do not differ substantially from the rest of the school-age population in terms of overall intellectual functioning. Many of these children, however, show academic *performance* problems despite adequate *abilities* as measured by standardized tests. These children often exhibit less on-task behavior as compared to peers and have less opportunity to respond to and track with academic instruction. Growing evidence also suggests that the behavioral symptoms of ADHD disrupt academic skill acquisition and performance.

## **6. Does ADHD Appear to Be the Primary Diagnosis?**

### **Suspected Alternative Primary Condition**

If an alternative primary diagnosis is assessed through completion of an appropriate evaluation and an alternative primary diagnosis is identified that accounts for the presenting symptoms, the patient would be "out of guideline" and would be managed or referred as appropriate to the condition. Possible examples might include anxiety disorders, depression and cognitive impairment.

Patients undergoing further assessment for biomedical, emotional/psychiatric, family/psychosocial, speech/language and academic/learning problems may be identified as having a primary diagnosis other than ADHD that accounts for their symptoms. For these patients, symptoms are not due to ADHD; therefore, these patients do not fall within the scope of this guideline. The primary clinician is encouraged to coordinate care with multidisciplinary subspecialty consultation as indicated.

### **Suspected ADHD with Comorbid Condition**

If ADHD is the likely primary diagnosis but a comorbid condition is also suspected, the clinician may choose to proceed to step 10 while concurrent evaluation of the suspected comorbid problem is completed. This would allow the clinician to continue to move into appropriate management strategies in a time-efficient manner. It is important to consider some degree of caution here in that comorbid issues can be of equal importance to the diagnosis of ADHD. Therefore they must be fully evaluated and the overlapping nature of the conditions (e.g., ADHD and learning disabilities) must be considered prior to moving fully into the management plan. Possible examples might include oppositional defiant disorder and learning disability.

## **8. Any Additional Related Comorbidities Identified?**

Patients undergoing assessment for biomedical, emotional/psychiatric, family/psychosocial, speech/language and academic/learning problems may be identified as having a related comorbidity to the primary ADHD condition.

## 9. Desire Subspecialty Consultation for ADHD Management?

For those patients with ADHD and a comorbid condition identified, the primary clinician is faced with the option of medically managing the ADHD component or utilizing medical subspecialty consultation. This decision depends on the complexity of the comorbid condition and its relationship to the ADHD symptoms, as well as on the individual clinician's own threshold of expertise and knowledge.

The type of medical subspecialty consultation may include the following:

- Child-Adolescent Psychiatry
- Developmental-Behavioral Pediatrics
- Pediatric Neurology

The primary care clinician is encouraged to coordinate care between medical and non-medical (e.g., mental health, school/educational, speech/language) subspecialty consultation as indicated.

## 10. DSM-IV-TR/DSM-PC Criteria Confirmed?

Only after careful evaluation of the patient's primary symptoms and complete screening for any comorbidity or other primary condition is the clinician able to confirm the diagnosis of ADHD.

## 11. Out of Guideline – Need for Further Evaluation

For those patients not meeting DSM-IV-TR/DSM-PC criteria and not having another condition identified, close monitoring and further evaluation of their learning or behavior problem are indicated. Subspecialty consultation may be helpful due to the nature and complexity of such cases. Such patient(s) would no longer be within the scope of this guideline.

## 12. ADHD Diagnostic Formulation Completed

A comprehensive diagnostic formulation for a child with ADHD is critical so that parents clearly understand their child's attentional difficulties as part of an inclusive picture of his or her functioning. Findings should be presented to families within a biopsychosocial framework. Discussion of the ADHD diagnosis should be presented within the context of associated comorbid mental health diagnoses and issues, academic performance issues, learning disabilities, developmental concerns, medical diagnoses, social concerns, family issues and stressors (*Garfinkel, 1992 [R]; Reiff, 1993 [R]*). It is crucial to discuss the child's and the family's strengths, as well as their vulnerabilities.

Adequate and appropriate treatment planning should then follow from a comprehensive and accurate diagnostic formulation.

## Management Algorithm Annotations

### 13. Education of Key Individuals

Upon initial diagnosis of ADHD, education of key individuals including the parents, the child and school personnel is imperative.

For the parents, this should include information on neurologic mechanisms, common features of ADHD and how they relate to the child's previous and current problems, and future expectations of clinical course and intervention strategies. The importance of individual teacher selection each year should be emphasized.

For the child, a developmentally appropriate explanation and demystification of ADHD using specific metaphors and examples is especially helpful. This should include not only explanation of related difficulties, but also discussion of the child's strengths and attributes.

For school personnel in contact with the child, one should not assume teacher knowledge of ADHD. It is important to provide specific teacher-focused information for the parents to share with all appropriate individuals. This information not only should explain ADHD related to the child's classroom difficulties, but also should address appropriate intervention strategies and modifications as described in Annotation #21, "School Interventions."

Please refer to the Support for Implementation section for specific recommended educational materials and resources directed to parents, children and adolescents, and teachers.

## **14. Medication Trial(s)**

### **Key Points:**

- Psychostimulant and non-stimulant medications are FDA-approved therapy in children with ADHD.
- Avoid the use of CNS stimulants in patients with **known** structural cardiac abnormalities, cardiomyopathy, serious heart rhythm abnormalities, coronary artery disease, or other serious cardiac problems that could place patients at an increased risk to the sympathomimetic effects of CNS stimulants.
- All patients should receive a cardiovascular personal and family history, and a physical prior to initiation of stimulants. Medication history or physical exam changes consistent with possible cardiac disease during treatment with stimulant medication may require additional evaluation by a cardiologist.
- Two studies show statistically better response to methylphenidate over atomoxetine.
- Guanfacine has not been studied head to head with methylphenidate.

The decision to use medication should be made in conjunction with parents following a thorough discussion of expected benefits and potential risks. Factors such as the child's age, severity of symptoms and presence of comorbidity should also be considered and may involve decision-making regarding choice of medication (*Faraone, 2003 [M]*).

Optimal medication management alone is superior to other modalities for the core symptoms of ADHD. [*Conclusion Grade I: See Conclusion Grading Worksheet A – Annotation #14 – (Medication Trial[s])*]

Stimulants increase the availability of neurotransmitters at presynaptic terminals. Non-stimulant atomoxetine affects the presynaptic norepinephrine transporter, increasing norepinephrine, while guanfacine is an alpha-2 agonist selective to the prefrontal cortex, which also results in increased neurotransmitters in the synapse. This increase of neurotransmitters is theorized to allow the child to exhibit more purposeful, goal-oriented behavior by focusing attention, lessening impulsiveness, and decreasing motor activity.

Occasionally a comorbid condition may warrant the consideration of alternative medications. In the presence of comorbidity, the primary symptoms of concern should influence the medication decision.

## Psychostimulant and Non-Stimulant Medications

An open-label, multisite study of methylphenidate showed parent/caregiver global assessment of effectiveness ranged from 87% at month three and investigator assessment for second year of treatment ranged from 91% to 95% (Wilens, 2005 [D]).

A placebo-controlled, double-blind study (Newcorn, 2008 [A]) shows response rates of 45% for amoxetine and 56% for methylphenidate, both superior to placebo response at 24%. The focus study (Starr, 2005 [A]) in African American children showed response rates of 68% for methylphenidate and 49% for atomoxetine.

Treatment with psychostimulants is often safe and effective in managing many children with ADHD with mild to moderate tics. Nevertheless, frequency and severity of tics should be carefully monitored in these patients. No routine blood work is necessary before or during psychostimulant therapy.

Dosages should be adjusted for each child depending on body weight, degree of impairment, and specific symptoms targeted for improvement. Children with ADHD of the predominantly inattentive type have been shown to respond well to low doses of methylphenidate. Children with ADHD, combined-type or predominantly hyperactive, have shown more positive response at moderate to high doses of methylphenidate. Please refer to the table, "Summary of FDA-Approved ADHD Medications for Use in Children and Adolescents," for information on dosing, titration and adverse effects of specific medications, and Annotation #22, "Maintenance and Continuing Care."

Each of these stimulant medications has the common adverse effects of decreased appetite, insomnia, headache, stomachache and irritability. If sleep problems are reported, determine factors that may influence response to stimulant treatment (Stein, 1999 [C]).

Absolute contraindications to the use of psychostimulants include psychosis, certain cardiovascular conditions, or previous untoward reactions to stimulant medication.

Avoid the use of CNS stimulants in patients with **known** structural cardiac abnormalities, cardiomyopathy, serious heart rhythm abnormalities, coronary artery disease, or other serious cardiac problems that could place patients at an increased risk to the sympathomimetic effects of CNS stimulants.

All patients should receive a cardiovascular personal and family history, and a physical prior to initiation of stimulants. Medication history or physical exam changes consistent with possible cardiac disease during treatment with stimulant medication may require additional evaluation by a cardiologist.

There are no studies that demonstrate a higher risk of sudden cardiac death with stimulant medications when compared to the general population (Nissen, 2005 [R]).

The American Academy of Pediatrics continues to encourage primary care and subspecialty physicians to include stimulants as an important treatment option for ADHD without routine ECG or routine subspecialty cardiology evaluations. Practitioners should be aware of potential risk and consider additional evaluation by a pediatric cardiologist if pre-treatment screening or concurrent treatment evaluations suggest cardiac disease (Vetter, 2008 [R]).

Response to one stimulant does not predict response to the others. If a child is a non-responder to one stimulant, it is advisable to attempt a second or third trial with other stimulants.

A randomized study of atomoxetine in the school setting showed 70% of children with ADHD responded in the medication intervention group (as defined by a 20% reduction in the Attention-Deficit/Hyperactivity Disorder Rating Scale-IV-Teacher version: total score by teacher report) compared with 43% in the placebo group (Weiss, 2005 [A]).

Atomoxetine has demonstrated efficacy over placebo in two placebo-controlled trials (Michelson, 2001[A]; Michelson, 2002 [A]).

## **Algorithm Annotations**

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Atomoxetine is a good option for patients with comorbid anxiety, sleep initiation disorder, substance abuse, or tics, or if initially preferred by parents and/or physician. Atomoxetine is a non-controlled substance that may make it preferable in certain clinical situations. Potential adverse effects include somnolence, nausea, anorexia, mild increase in blood pressure or heart rate, and skin rash.

Extended-release guanfacine demonstrated a statistically significant 50% decrease in baseline ADHD-RS-IV scores in one large clinical trial (*Salle, 2009 [C]*). Side effects of guanfacine include somnolence, headache, fatigue and sedation (*Salle, 2009 [C]*).

In 2004 the FDA issued a paper advising health professionals about a warning regarding atomoxetine. The labeling has been updated with a bolded warning about the potential for severe liver injury, following two reports. The warning indicates that the medication should be discontinued in patients who develop jaundice or laboratory evidence of liver injury. Currently, routine liver function tests are not being recommended for those taking this medication.

In September 2005, the FDA issued an alert advising health professionals about an increased risk of suicidal thinking in children and adolescents being treated with atomoxetine. The labeling has been updated with a boxed warning.

Table 2: Summary of FDA-Approved ADHD Medications for Use in Children and Adolescents

Medications	Starting Dose <sup>1</sup>	Titration & Timing of Doses	Predominant Adverse Effects	Comments
<b>Immediate-Release Stimulant</b>				
<p>Methylphenidate<sup>2</sup></p> <ul style="list-style-type: none"> <li>(Ritalin® Short-acting) 5 mg, 10 mg, 20 mg tabs;</li> <li>(Methylin® Short-acting) 5 mg, 10 mg, 20 mg tabs; 2.5 mg, 5 mg, 10 mg chew tab; liquid 5 mg/5 mL, 10 mg/5 mL</li> </ul> <p>Dosage range: 0.3-0.7 mg/kg/dose. (Total daily dose usually does not exceed 60 mg/day)</p>	<p>&lt; 8 years (&lt; 25 kg) start with 5 mg/dose BID</p> <p>&gt; 8 years (&gt; 25 kg) start with 10 mg/dose BID</p>	<p>Increase by 2.5-5 mg/dose (depending on wt) a.m. &amp; noon; add 4 p.m. dose as needed</p>	<p>Decreased appetite, insomnia, headaches, increased HR</p>	<p>Adjust doses every 1-2 weeks as needed and tolerated</p>
<p>Dexmethylphenidate</p> <ul style="list-style-type: none"> <li>(Focalin® Short-acting) 2.5 mg, 5 mg, 10 mg tablets</li> </ul>	<p>Not currently taking methylphenidate</p> <p>Children &gt; 6 years and Adults: 2.5 mg BID</p>	<p>Adjust in increments of 2.5-5 mg weekly; max dose 20 mg/day</p>	<p>Headache, decreased appetite, restlessness, abdominal pain, increased HR</p>	<p>Give doses at least 4 hours apart</p> <p>For conversion from methylphenidate, initiate at half the total daily dose of racemic methylphenidate</p> <p>Caps may be opened and sprinkled on apple sauce</p>
<p>Dextroamphetamine</p> <ul style="list-style-type: none"> <li>(Dexedrine® Short-acting) 5 mg tabs, (Dextrostat® Short-acting) 5 mg, 10 mg tabs</li> </ul> <p>Dosage Range: 0.2-0.4 mg/kg/dose (Total daily dose usually does not exceed 40 mg/day)</p>	<p>3-5 years; 2.5 mg daily</p> <p>&gt; 6 years; 5 mg daily or BID</p>	<p>Increase weekly with 2.5-5 mg tab/dose; a.m. &amp; noon; add 4 p.m. dose as needed</p>	<p>Decreased appetite, insomnia, headaches, increased HR</p>	<p>Typical dextroamphetamine dose is approximately half of the equivalent methylphenidate dose</p>

See footnotes at end of table.

Algorithm Annotations

Medications	Starting Dose <sup>1</sup>	Titration & Timing of Doses Sustained-Release/Long-Acting Stimulant	Predominant Adverse Effects	Comments
Methylphenidate <sup>2</sup> • (Ritalin SR®); 20 mg tabs  • (Ritalin LA®) 10 mg, 20 mg, 30 mg, 40 mg • (Metadate ER) 10 mg, 20 mg tabs (Methylin ER) 10 mg, 20 mg tabs  • (Metadate CD®) 10 mg, 20 mg, 30 mg, 40 mg, 50 mg, 60 mg • (Concerta®) 18 mg, 27 mg, 36 mg, 54 mg  • (Daytrana <sup>TM</sup> ) patch <sup>3</sup>  10 mg/9 hours, 15 mg/9 hours, 20 mg/9 hours, 30 mg/9 hours	20 mg SR in a.m. only (considered for use in children tolerating 10 mg/dose a.m. and noon) Children ≥ 6 years old and adults: 20 mg once daily in the a.m. 20 mg SR in a.m. only (considered for use in children tolerating 10 mg/dose a.m. and noon) Children ≥ 6 years old and adults: 20 mg once daily in the a.m. Children ≥ 6 years old and adults: 18 mg once daily in the a.m. Children 6-12 years: 10 mg patch once daily	Add 5 mg-10 mg immediate-release tablet in a.m. and/or at 4 p.m. May be increased 10 mg daily at weekly intervals Add 5 mg-10 mg tablet in a.m. and/or at 4 p.m. May be increased 10-20 mg daily at weekly intervals May be increased 18 mg daily at weekly intervals, approved up to 72 mg for adolescents May increase to next transdermal patch size no more frequently than every week	Decreased appetite, insomnia, headaches, increased HR Decreased appetite, insomnia, headaches, increased HR Decreased appetite, insomnia, headaches, increased HR Decreased appetite, insomnia, headaches, increased HR Decreased appetite, insomnia, headaches, increased HR Inert components of tablet (ghosts) can be seen in stool Apply patch to hip, holding for 30 seconds. Two hours before full effect is needed. Alternate hips every other day Remove 9 hours after application or sooner if shorter duration is desired Drug concentrations typically start to decline when patch is removed, but drug absorption may continue for several hours after patch is removed Patch cannot be cut Used patches contain residual drug – keep out of reach of children, dispose of properly May be useful for patients who cannot swallow oral meds or who need flexible dosing	In general, switching to long-acting formulation dose is equivalent to previous total daily dose
Dexamethylphenidate • (Focalin XR® Extended-release) 5 mg, 10 mg, 15 mg, 20 mg, 30 mg capsules  Dextroamphetamine • (Dexedrine®) Long acting capr. 5 mg, 10 mg, 15 mg  Mixture of amphetamine salts • (Adderall®) 5 mg-, 7.5 mg-, 10 mg-, 12.5 mg-, 15 mg-, 20 mg-, 30 mg tablets	Not currently taking methylphenidate Children > 6 years: 5 mg daily Adults: 10 mg daily  Start at twice regular BID tablet dose (e.g., calculated by adding first 2 doses of the day together and administering an equal spansule amount in the a.m.)  Start at 2.5-5 mg dose in a.m.	Children > 6 years: adjust in increments of 5 mg weekly; max dose 20 mg/day Adults: adjust in increments of 10 mg weekly; max dose 20 mg/day  Increased by 5 mg Spansule in a.m. only or add 5 mg tablets to a.m. dose Max 40 mg/day  Increase by 2.5 mg increments. Range for length of action is typically 5-8 hrs, depending on dose, can add second dose 6-7 hrs after a.m. dose Consider using tapered dose (smaller p.m. dose than a.m. dose); max. 40 mg/day May be increased 10 mg daily at weekly intervals Max 60 mg/day in 1-3 divided doses May be increased by 5-10 mg daily at weekly intervals. Once daily dosing. Children ≥ 6 years, max dose 30 mg/day. Adolescents 13 to adult, max dose 20 mg/day. Doses up to 60 mg have been studied; there is not adequate evidence that doses > 20 mg/day provide additional benefit.	Headache, decreased appetite, restlessness, abdominal pain, increased HR  Decreased appetite, insomnia, headaches, increased HR  Decreased appetite, insomnia, headaches, increased HR	Conversion from methylphenidate: initiate at half the total daily dose of racemic methylphenidate Conversion from regular release Focalin® to XR, same total daily dose Typical dextroamphetamine dose is approximately half of the equivalent methylphenidate dose
• (Adderall XR®) Extended-release <sup>4</sup> 5 mg, 10 mg, 15 mg, 20 mg, 25 mg and 30 mg extended-release capsules <sup>4</sup>	Children ≥ 6 years old to 17 years: 10 mg once daily in a.m. Adults may start with 40 mg/day		Decreased appetite, insomnia, headaches, increased HR	Unique property: as dose increases, Adderall® will last longer
Lisdexamfetamine dimesylate • 20 mg, 30 mg, 40 mg, 50 mg, 60 mg, 70 mg capsules	Children: 6-12 years and Adults: Initial: 30 mg once daily in the morning	May increase in increments of 10-20 mg/day at weekly intervals until optimal response is obtained Maximum: 70 mg/day Doses > 70 mg/day have not been studied.	Insomnia, headache, nervousness, dizziness, irritability Increased HR, BP	Pro-drug giving long duration of action.

See footnotes at end of table.

Algorithm Annotations

Medications	Starting Dose <sup>1</sup>	Titration & Timing of Doses	Predominant Adverse Effects	Comments
<b>Non-Stimulant</b>				
<ul style="list-style-type: none"> <li>Atomoxetine<sup>††</sup> (Strattera<sup>®††</sup>) 10 mg, 18 mg, 25 mg, 40 mg, 60 mg, 80 mg, 100 mg capsules</li> </ul>	Children and adolescents weighing up to 70 kg: initial dose 0.5 mg/kg/day once daily	Children and adolescents weighing up to 70 kg: after 3 days of dosing, increase to 1.2 mg/kg/day  Give once daily or may be evenly divided into 2 doses, in morning and evening	Nausea, vomiting, GI pain, anorexia, dizziness, somnolence, skin rash, pruritus  Increased heart rate or blood pressure, urinary retention, rare severe liver injury  Capsule should not be opened as atomoxetine is an ocular and mucous membrane irritant	The full effect may not be appreciated for up to 4 weeks on a given target dose  For patients weighing < 70 kg, the dose may be increased to a maximum of 1.4 mg/kg/day  The full effect may not be appreciated for up to 4 weeks on a given target dose
	Patients weighing > 70 kg: initial dose 40 mg daily once daily	Patients weighing > 70 kg: after 3 days of dosing, increase to 80 mg daily or may be evenly divided into 2 doses, in morning and evening		
<ul style="list-style-type: none"> <li>Guanfacine extended-release<sup>6</sup></li> <li>(Intuniv<sup>™</sup>) 1 mg, 2 mg, 3 mg, 4 mg extended-release tablet</li> </ul>	Children ≥ 6 years and adolescents: oral initial dose 1 mg once daily	May increase in increments no larger than 1 mg/week, based on clinical response	Somnolence, which can occur in up to 38% of patients, headaches, fatigue, upper abdominal pain, nausea, lethargy, dizziness, irritability, decreased blood pressure, and decreased appetite	Do not crush or chew extended release tablet  Do not administer with high-fat meal (increased absorption)  Metabolism by CYP3A4 system gives potential for drug interactions  May be advantageous for those not able to tolerate stimulant medications.  Not interchangeable with regular release guanfacine tablets  FDA approval September 2009; no post-marketing data available at creation of this guideline  Safety and efficacy of long-term use for the treatment of ADHD (> 2 years) have not been established

See footnotes at the end of the table.

**Table 2 Footnotes**

- <sup>1</sup> The notion that stimulants are primarily dosed by weight of the patient (e.g., 0.3 to 0.5 mg/kg/dose) is not entirely accurate. Studies would suggest that each individual's unique metabolic capacity for stimulants determines how they will respond. Therefore, in general, it may be wise to start at low doses for most patients (2.5-5 mg) and then titrate the dose upward, instead of automatically starting larger children on higher doses. The starting dose of stimulant medications during adolescence is often lower, on a mg/kg basis, than for or during elementary school children, although gradual dosage titration is the same. Slow-release formulation can often lessen school-related drug administration problems and patient resistance to taking medications. All dosing is referenced back to the Lexi-comp Drug information handbook, online.
  - <sup>2</sup> Patients starting on methylphenidate should be maintained on an AB-rated product to avoid differences in bioavailability. AB rating may be verified using a reference such as the Drug Topics Red Book available in most pharmacies.  
  
An FDA-approved patient medication guide is available with the product information and as follows, must be dispensed with the following medications for each new outpatient prescription and refill:  
  
Ritalin-SR®: <http://www.fda.gov/downloads/Drugs/DrugSafety/ucm089826.pdf>  
Ritalin LA®: <http://www.fda.gov/downloads/Drugs/DrugSafety/ucm089092.pdf>  
Ritalin®: <http://www.fda.gov/downloads/Drugs/DrugSafety/ucm089090.pdf>  
Methylin® oral solution: <http://www.fda.gov/downloads/Drugs/DrugSafety/ucm088640.pdf>  
Methylin® chewable tablet: <http://www.fda.gov/downloads/Drugs/DrugSafety/ucm088639.pdf>  
Metadate CD®: <http://www.fda.gov/downloads/Drugs/DrugSafety/ucm088635.pdf>  
Concerta®: <http://www.fda.gov/downloads/Drugs/DrugSafety/ucm088575.pdf>  
Daytrana™: <http://www.fda.gov/downloads/Drugs/DrugSafety/ucm088581.pdf>
  - <sup>3</sup> Although methylphenidate has been well studied for ADHD, clinical studies of the Daytrana™ patch delivery system are limited.
  - <sup>4</sup> For patients unable to swallow tablets, there is the possibility of making a suspension. The formulation information is found in the following article: Justice J, Kupiec TC, Matthews P, Cardona P. "Stability of Adderall® in extemporaneously compounded oral liquids." *Am J Health Syst Pharm* 58:1418-21, 2001.
  - <sup>5</sup> Do not use concurrently or within two weeks of MAO inhibitors. Concurrent use with Cytochrome P450 CYP2D6 inhibitors may significantly increase atomoxetine concentrations, requiring atomoxetine dose reduction.
  - <sup>6</sup> Sallee FR, McGough J, Wigal T, et al. Guanfacine extended release in children and adolescents with attention-deficit/hyperactivity disorder, a placebo-controlled trial. *J Am Child Adolesc Psychiatry* 2009;48:155-65. (Class C)
- † This medication should be discontinued in patients who develop jaundice or laboratory evidence of liver injury.
- \* **This information is current as of January 2010. See prescribing information for complete details. For the most up-to-date medication information, consider the following sources: [www.epocrates.com](http://www.epocrates.com), [www.micromedex.com](http://www.micromedex.com), [www.uptodate.com](http://www.uptodate.com), [www.pdr.net](http://www.pdr.net).**

Brand names were left in this table because delivery methods are specific to these medications. The work group is not endorsing a particular product.

## 16. Successful Alternative Medication(s) Trial(s)?

When adequate stimulant and atomoxetine trials are unsuccessful due to either poor response or adverse effects, or if associated comorbidity is present, alternative medication trials may be considered (see Table 3).

Adverse effects of these medications may be more common and potentially more serious than with the stimulants. In addition, fewer studies are available documenting their benefit and safety in children or adolescents compared to the stimulants. The primary clinician may decide to continue management based on individual knowledge and expertise or may refer for subspecialty consultation. In either case, the patient would no longer be within the scope of this guideline.

on individual knowledge and expertise or may refer for subspecialty consultation. In either case, the patient would no longer be within the scope of this guideline.

**Table 3: Summary of Alternative Medications That May be Considered for Children and Adolescents**

Medications	Starting Dose	Titration & Timing of Doses	Predominant Adverse Effects	Comments
Bupropion (Wellbutrin®) 75 mg, 100 mg regular tablets  100 mg SR, 150 mg SR extended-release tablets BID  150 mg XL, 300 mg XL extended-release tablets (daily)	6-12 year: 1.4-2 mg/kg/day; usually 37.5 mg BID or 50 mg BID  3 mg/kg/day up to 150 mg/day	6-12 yr; gradually increase over 2 weeks to 6 mg/kg/day up to 2.50 mg/day in divided doses Adolescents: over 2 weeks up to 300 mg to 400 mg/day  Adolescents: over 2 weeks up to 450 mg/day	Sedation, constipation, dryness of mouth, may lower seizure threshold	Further controlled studies needed. Some studies show bupropion may decrease hyperactivity and aggression, and improve cognitive performance of children with ADHD and CD  To reduce seizure risk, space regular tablets at least 4-6 hours apart and sustained-release tablets 8 hours apart  Maximum single dose 150 mg (regular-release) and maximum daily dose 450 mg
Clonidine (Catapres®) tablets 0.1 mg, 0.2 mg, 0.3 mg and Transdermal Patch 1.2, 3 = 0.1 mg, 0.2 mg, 0.3 mg delivered continuously for up to 7 days	Start with 0.05 mg QD	Increase dose by 0.05 mg/day every 7 days to a max of 0.3 mg/day	Sedation, rashes with skin patch, orthostatic hypotension (less than 5% of those treated)	Possibly more effective for tics or marked impulsivity/aggression Do not abruptly discontinue therapy Clinical effect may not be evident for up to 6-8 weeks
Guanfacine (Tenex®) tablets 1 mg, 2 mg	0.5-1 mg QD	Increase dose by 0.5 mg q 3-4 days to maximum of 4 mg/day in divided daily dose	Fatigue, headache, insomnia	Has longer half-life, less sedation than clonidine May provide a safe alternative therapy for children with ADHD in the presence of tics Do not abruptly discontinue therapy Clinical effect may not be evident for up to 6-8 weeks
Imipramine (Tofranil®) tablets 10 mg, 25 mg, 50 mg	0.5-1 mg/kg/day in divided doses	Increase 1 mg/kg/wk up to 4 mg/kg/day Doses usually do not exceed 5 mg/kg/day (divided doses are preferred)	Cardiac conduction disturbances, dry mouth, urinary retention, headache	Therapy is usually reserved for older children or adolescents not responding to stimulants Obtain baseline EKG and periodically monitor during therapy <sup>2</sup> All children and adolescents treated with antidepressants for any indication require close monitoring for suicidality or unusual changes in behavior
Desipramine <sup>1,2</sup> (Norpramine®) tablets 10 mg, 25 mg, 50 mg, 75 mg, 100 mg, 150 mg	0.5-1.0 mg/kg/day in divided doses	Increase 1 mg/kg/wk up to 4 mg/kg/day Doses usually do not exceed 5 mg/kg/day (divided doses are preferred)	Cardiac conduction disturbances, dry mouth, urinary retention, headache	

<sup>1</sup> EKG Monitoring Guidelines (imipramine, desipramine):

- HR < 130 at rest
- QRS < 30% over baseline
- PR < 210 msec
- QTc < 450 msec
- BP < 130/85

<sup>2</sup> Cases of sudden death have been reported with desipramine, but a cause and effect relationship has not been established. Despite the uncertainty of the role of desipramine in these cases, it is prudent to exercise a heightened level of caution when instituting and monitoring therapy

**This information is current as of January 2010. See prescribing information for complete details. For the most up-to-date medication information, consider the following sources:**  
[www.epocrates.com](http://www.epocrates.com), [www.micromedex.com](http://www.micromedex.com), [www.cuptodate.com](http://www.cuptodate.com), [www.pdr.net](http://www.pdr.net).

Brand names were left in this table because delivery methods are specific to these medications. The work group is not endorsing a particular product.

## 18. Multimodal Management Coordinated by Primary Clinician

### Key Points:

- As with many conditions, ADHD is rarely a singular diagnosis.
- Multimodal intervention is commonly needed for other concomitant conditions and comorbidities.
- Medication is the cornerstone of treatment for ADHD.

As with many conditions, ADHD is rarely a singular diagnosis. Multimodal intervention is commonly needed for other concomitant conditions and comorbidities. The primary care physician is in a unique position to coordinate care.

A 1992 large-scale randomized clinical trial sponsored by the National Institute of Mental Health and the U.S. Department of Education examined the efficacy of medication management, intensive behavioral treatment, the two combined, and standard community care for the treatment of children with ADHD Combined Type (*MTA Cooperative Group, 1999 [A]*). Results indicated that for the core symptoms of ADHD, "medication management was superior to behavioral treatment and to routine community care that included medication." Combined treatment of medication management and intensive behavioral treatment did not yield significantly greater benefits than medication management alone (*Arnold, 2004 [A]*; *MTA Cooperative Group, 2004a [A]*; *MTA Cooperative Group, 2004b [A]*). At six- and eight-year follow-up, almost all the patients were getting only community care and no longer medications. This has led to false conclusions that meds are no longer beneficial. Previous phases of the MTA studies looked at cost-benefit ratio, which is a more reasonable factor for choosing another modality of care (*Molina, 2009 [A]*).

A meta-analysis of randomized controlled trials from 1985 to 2006 found there were no greater improvements of ADHD symptoms with the addition of behavioral therapy. Social behavior and oppositional-defiant disorder outcomes improved with a combination of medication and behavior therapy. This combination made no difference in academic functioning (*Van der Oord, 2008 [M]*). Use of medication may improve the response to other therapies (psychoeducation, behavior therapy) in the school setting (*Dopfner, 2004 [A]*).

In young children (ages 7-9), no benefit was found for clinic-based social skills training over stimulant use (*Abikoff, 2004a [A]*). Another analysis of this study population found no support for adding long-term psychosocial interventions but found benefits from stimulant medication over two years (*Abikoff, 2004b [A]*). Children without learning or conduct disorders who responded to stimulants did not further benefit from therapy or academic assistance (*Hechtman, 2004 [A]*).

## 19. Parents/Family Focused Strategies

### Key Points:

- Parents have a unique role in ADHD management because they see their children in all areas of life and have the long-term goal of seeing their children become successful, well-adjusted members of society.
- Parents learn management skills through ADHD support groups, advocacy groups and parenting skills training.
- Parents find specific intervention strategies to be helpful.

Parents have a unique role in ADHD management as the primary advocates for their children. They see their children in all areas of life and desire to see them function successfully, not just in the educational

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setting but in the home, in sports and socially. They have a long-term goal of seeing their children become successful, well-adjusted members of society and are the only people to follow the children over the years into and through adulthood. Schools and physicians will change, but the parents will be there to provide continuity in the management of their children as they strive toward adulthood. Through support groups, skills training and advocacy, parents can be more directed and better able to cope with the demanding situations that occur with ADHD children (*Horn, 1987 [A]; Shelton, 1992 [R]*).

**ADHD Support Groups**

These groups help parents learn more about ADHD through lectures or reading material and can help parents cope emotionally by communicating with other parents of ADHD children in a supportive setting. The Attention Deficit Disorder Association (ADDA) and Children and Adults with Attention Deficit Disorder (CHADD) are two such groups and have local chapters in many areas. A children's or community hospital in the area or the child's school or school district may also have a support group.

**Advocacy Groups**

Groups exist to help parents learn about what rights their children have in the educational setting and what special services are available for their needs. These groups can also aid in parent interactions with the school system and can give parents some direction in finding services for their children. One such group is Parent Advocacy for Children's Educational Rights (PACER). Additional resources are listed in the Support for Implementation Resources section of this guideline.

**Parenting Skills Training**

One of the most useful strategies a parent can undertake to improve harmony in the home is to learn ways to set children up for success by providing a structured home environment, clear expectations, consistent responding, positive attention for appropriate behaviors and appropriate consequences for maladaptive behaviors. Learning the above methods serves to give the child direction, goals and limits in hopes of improving compliance, increase self-esteem, enhance positive aspects of the parent-child relationship, and reduce tension and struggles within the home. Although this training can be obtained through formal classes and books, research demonstrates that changes in parenting knowledge do not necessarily translate into changes in parenting behavior. A recent meta-analysis (*Kaminski, 2008 [M]*) that reviewed effects of parenting training programs on childhood externalizing behaviors including ADHD found that increasing positive parent-child interactions, practicing with one's own child, and learning time-out/disciplinary consistency (responding the same way every time to a misbehavior) were essential components of parent training programs. Moreover, less active involvement (modeling, homework, etc.) were not found to be effective components of parenting training programs.

**Suggestions for Parents**

Many of these suggestions are best executed when parents are consulting with a specialist in behavioral therapy.

- Note problem behaviors, and make notations of frequency and severity to help make the problems more objective and to aid in monitoring improvements as behavioral changes are made.
- Provide consistent schedules and routines with forewarning of any upcoming changes.
- One or two simple, clear instructions should be given at a time. The child should repeat the instructions back to ensure comprehension.
- Clear, concise rules should be provided for the behavior of all family members, with consistent follow-through of appropriate consequences and rewards.

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- Decrease inappropriate behavior by allowing:
  - natural consequences to the child's actions,
  - logical consequences linked to the offending behavior, and
  - time-outs.
- Create consistent sleep habits and a restful sleep environment.
- Have a special quiet spot with few distracting influences for doing homework or working on projects.
- Allow the child choices within set limits so that the child has a sense of some control.
- Make sure the child knows his or her behavior is the issue or problem, not the child himself or herself.
- Try to spend 10-15 minutes daily focusing on this child alone to listen and let them know they are important. Parents should avoid giving commands, choosing the activity, criticizing behaviors, or asking questions. As much as possible, rather, the time should be spent actively listening and attending to your child's activity.
- Utilize differential social attention to decrease ADHD behaviors that are not aggressive or dangerous to self, others or property. You can do this by ignoring behaviors like interrupting others, wherein you provide no attention (e.g., eye contact, verbal, smiling at them, etc.) to the problem behavior (e.g., "Thanks for being quiet while I finished talking to my friend"). This strategy is often taught in parent training programs.
- Incorporate prevention strategies such as visuals (e.g., timers, posted hour rules, etc.) to promote on-task and adaptive behaviors.
- Create a sticker, point or token system to track and reward specific behaviors that you want to increase (e.g., working on homework for 15 minutes without getting up from table). Behaviors should be stated positively and be something that the child can obtain. Expectations can increase (e.g., 20 minutes instead of 15) as children demonstrate success with initial goals.
- Parents serve as models for their children. It is important to demonstrate appropriate coping methods in front of children so they can learn positive methods to channel their frustrations. Hence, it is important for parents to take a break or a time-out from the child if he or she is becoming too frustrated or angry. Ensure that you have access to immediate social supports (e.g., friends or relatives whom you can reach quickly if you need someone to talk to about your child's behaviors).

### **Comorbidity Present**

In cases with significant family dysfunction or other stresses (e.g., financial, health problems, chemical dependency issues), individualized family therapy may be more appropriate. In-home counseling may be available through county services.

## **20. Child Interventions**

### **Key Points:**

- Consider the need for social skills training to improve peer relationships that are often negatively affected by ADHD symptoms (e.g., impulsivity).
- Cognitive-behavioral therapy may be warranted to teach children how to be more reflective in problem solving.

- Study skills and organizational skills are additional areas to target.
- Neurofeedback may be a reasonable alternative to medication use in ADHD or be used as part of a multimodal treatment program.

To date, no well-designed studies have been empirically validated to support the use of social skills training, problem-solving training or study/organizational skills training in the direct treatment of ADHD. Anecdotal endorsement of these interventions does exist. Using the same criteria for acceptance of psychosocial treatments for ADHD and those used for acceptance of medication treatments for ADHD is difficult, given the methodological limits and complexities of psychosocial research. Thus, the following interventions may be understood and most appropriate for implementation with individuals with ADHD when problems with social skills, problem solving or organization co-occur with or develop secondarily to ADHD symptoms.

The purpose of education of the child is to provide the basis for further independence. The person with ADHD will be managing his/her own environment and interpersonal relationships, and choosing a vocation (*Minnesota Department of Education, 1993 [R]; Shapiro, 1994 [R]*). Without insight and specific strategies to address this impairment, long-term consequences may include decreased self-esteem and poor problem solving. Loss of social support from peers has long-lasting consequences. Early intervention can avert the resulting loss of self-esteem and productivity.

### **Social Skills Training**

The child's social skills are resources for solving the specific problems that arise from ADHD. Interpersonal problems and difficulties with peers may occur secondary to impulsivity (e.g., unpredictable behavior). As a child gets older, unpredictable behavior is less tolerated by peers and within the family.

Social skills building is meant to offer immediate practical skills in a safe setting. Sometimes this can be a way to have several people (family, school, friends) offering the same message about appropriate behavior and may have a better chance of being generalized to a larger setting.

Social skills training (group or individual) instructs children in the execution of specific prosocial behaviors (*Guevremont, 1993 [D]; Kazdin, 1989 [A]; Pelham Jr, 1998 [R]*). It is appropriate for children who exhibit difficulties in initiating and maintaining positive peer interactions. Children with ADHD often show deficient use of functional, pragmatic language in social situations. This type of training is designed to increase knowledge about appropriate and inappropriate social behaviors. The various target skills may include maintaining eye contact, initiating and maintaining conversation, sharing and cooperating. Role-playing exercises with group feedback are commonly used.

Social skills building groups may be available through the school (*Shapiro, 1994 [R]*). These may be recognized as "friendship groups" or "social skills groups." Early childhood family education, which may include children older than the preschool-aged child, is also available. Some other community resources may include the YMCA, community education or local health organizations.

### **Problem-Solving Strategies/Cognitive Behavioral Therapy**

The goal of self-instructional problem solving training is to help children who have ADHD "stop and think" before acting. This therapeutic modality falls under the general category of cognitive-behavioral therapies. Designed to facilitate self-control and reflective problem solving, it is appropriate for children who exhibit impulsive, non-self-controlled behavior and/or manifest deficits in problem solving. This can be accomplished through the use of various resources: family therapy, in-home therapy, an individual therapist or county services (if available). All options should be coordinated with school efforts (*Fehlings, 1991 [A]; Hinshaw, 1984 [A]; Pelham, 1992 [R]*).

### Study/Organizational Skills Training

Study and organizational skills building should be offered in conjunction with curriculum intervention (*Minnesota Department of Education, 1993 [R]*). The curriculum should be concrete and sequential with only essential information as a requirement. Specific interventions can address issues, such as:

- |                |   |
|----------------|---|
| Behavior:      | Difficulty sequencing and completing steps to accomplish specific tasks (e.g., writing a book report or term paper, organizing paragraphs, solving division problems) |
| Accommodation: | Break task into workable and manageable component tasks. Provide examples to accomplish task.   |
| Behavior:      | Difficulty prioritizing from most to least important.   |
| Accommodation: | Prioritize assignments and activities. Provide a model to help students. Post the model and refer to it often.  |

### Neurofeedback

Neurofeedback (NF), a form of biofeedback, has been promoted as an alternative therapy for ADHD. Biofeedback provides a patient with information about his/her physiology, usually through biomechanical or bioelectrical means for the purpose of learning to self-regulate body functions. Neurofeedback uses EEG biofeedback to teach an ADHD child how to self-regulate certain brain activity patterns and then to generalize these skills into daily life. Two types of NF have been used to treat ADHD: slow cortical potential training (SCP) and theta/beta training. SCP trains slow cortical potentials. Negative potentials reflect increased excitation that occurs during behavioral or cognitive preparation. Positive potentials are believed to represent cortical excitation such as that seen during behavioral inhibition. Theta/beta training is designed to decrease theta activity (4-8 Hz) and increase beta activity (14-19 Hz) on the EEG that corresponds to an alert, focused and relaxed state.

Numerous studies of NF in the treatment of ADHD have been published. Early studies provided some evidence that NF may have some positive effects. However, significant methodologic problems with these studies have limited their usefulness. Shortcomings include lack of a control group, small sample sizes, no randomization, use of medication together with NF, and other confounding variables. A recently published randomized, controlled clinical trial demonstrated that NF was superior to a computerized attention skills training control intervention based on parent and teacher rating scales (*Gevensleben, 2009 [A]*). A medium effect size was reported. Fifty-two percent of the NF group were responders. The NF treatment group had improvement in ADHD subscales for inattention and impulsivity/hyperactivity of 25-30% compared to 10% for the control group ( $p < .005$  for inattention and  $p < .05$  for impulsivity/hyperactivity). This study also demonstrated improvement in social adaptation in the NF group.

While the recent study by Gevensleben et. al. has its own potential limitations (not double blind, possibility of other non-specific factors influencing results, no correlation of results with neurophysiologic measures, and relatively short trial with no long-term follow-up data), it is a rigorous study. These results need to be replicated.

Conclusion: NF has been demonstrated in one randomized, controlled clinical trial to be significantly better than a computerized attention skills training control. ADHD symptoms were moderately improved. NF may be a reasonable alternative to medication use in ADHD or be used as part of a multimodal treatment program. It should be administered by a clinician certified in neurofeedback using protocols similar to those used in the Gevensleben study. Long term benefits have not been definitively proven. The cost and time involved in treatment need to be taken into account. The clinician should assist families that choose to have their child learn NF in finding a certified neurofeedback practitioner and in assessing outcomes.

## 21. School Interventions

### Key Points:

- Primary care providers for children with ADHD should explore with school personnel and parents opportunities for services and supports for the child that are available within their school.
- Physicians and other primary health care providers are often in a good position to assist parents in advocating for appropriate school programming for children with ADHD.
- If the primary care provider or parents decide not to use medications to treat ADHD, despite its overwhelming effectiveness, it is still appropriate to implement the psychosocial interventions.

Even at optimal doses of medication, most children with ADHD have residual difficulties at school. Physicians and other primary health care providers are often in a good position to assist parents in advocating for appropriate school programming for children with ADHD. Several classroom strategies are listed in this annotation. Although it is not expected that the primary care provider will act as an expert "consultant" in this area, it is important for him or her to have enough background familiarity with these issues to be an effective advocate, and to be able to educate and empower parents on these issues.

Non-pharmacological interventions such as behavioral management and educational accommodations/modifications in the classroom have been found to assist children with ADHD in coping with and compensating for the academic and social difficulties associated with this disability (*Bloomquist, 1991 [A]; Carlson, 1992 [A]; DuPaul, 1994b [NA]; Fowler, 1992 [R]; Hinshaw, 1992 [R]; Pelham Jr, 1993 [A]; Pelham, 1992 [R]; Whalen, 1991 [R]*). If the primary care provider or parents decide not to use medications to treat ADHD, despite its overwhelming effectiveness, it is still appropriate to implement the psychosocial intervention.

### Classroom Strategies for Children with ADHD

- A high degree of order and predictability to the classroom
- Clear and consistent rules and expectations
- Classroom organizational strategies such as a posted daily work schedule, written notices for homework assignments, quiet work areas, and seating close to teacher and near positive peer models
- Training for students in study skills and time management
- Regularly scheduled, frequent breaks
- Creation of multisensory learning activities that are engaging and use various attention-getting devices
- Reduction of the amount of work assigned or other modifications of assignments
- Liberal use of positive reinforcers immediately and continually for desired behaviors
- Establishment of a school-home daily note card system to maintain parent-teacher contact with regard to academic and behavioral progress and problem areas
- Working with the student on self-monitoring, self-reinforcement and development of compensatory/adaptive strategies

Ongoing collaboration and communication between teachers and primary care providers is desirable in order to discuss and implement effective treatment strategies for each child. It is also important for the

primary care provider to communicate with school staff about his/her perceptions of the child's diagnosis (or diagnoses) with particular attention to any medical/neurologic problems (e.g., Tourette's syndrome, mental retardation, seizures, hearing impairment, chronic medical conditions) that might be important for the teachers to understand. They may also want to discuss the perceived role of psychotropic medication and answer any questions about expected benefits, side effects, etc.

The severity of the child's ADHD and its adverse impact on academic performance will determine whether the child qualifies for special education services. The three educational service categories most commonly identified for children with ADHD (in school terminology) are Learning Disability (LD), Emotional/Behavioral Disorder (EBD) and Other Health Disability (OHD). Students with ADHD who do not meet eligibility criteria for the specific programs described (LD, EBD, OHD) may still need some level of assistance to be successful and may still receive specialized instruction and accommodations in the regular classroom. This is stated in section 504 of the Federal Rehabilitation Act of 1973 and is intended to insure a "free and appropriate education in the least restrictive environment" for all students, including those with a physical or mental impairment that limits learning. **In these cases, parents should be encouraged to formally request a Section 504 plan for their child from school administration. Adequate documentation of the child's impairment (e.g., ADHD or other diagnosis) will be required from the physician.**

### **Comorbidities Present**

Specific learning disabilities comorbid to ADHD must be treated concurrently with appropriate special educational programming. Primary care providers should develop a basic understanding of the Individualized Educational Plan (IEP), the document that details the student's direct and indirect special educational services.

Speech- and language-related difficulties must also be treated and supported across the curriculum, and can have an impact on a number of subject areas and tasks. Children with ADHD who are also hearing impaired may require special assistance such as an "auditory trainer" device and other classroom accommodations. Most districts have the availability of a hearing impairment specialist to consult on these clients.

## **22. Maintenance and Continuing Care**

### **Key Points:**

- ADHD has an impact in all domains of a child's life. The child usually does not outgrow ADHD but instead learns to cope and compensate for this chronic condition. All measures are aimed at building successes for the child in day-to-day life.
- Evaluation and management visits of these patients should take into consideration medical, psychosocial and educational aspects.
- Anticipatory guidance is given at each visit; this can include immediate and long-term expectations, study and organizational skills, guidance on behavior management, adolescent concerns and updating resources. Advocacy issues and revising multimodal care management may be needed.
- The transition of the adolescent with ADHD to adulthood recognizes the need for careful planning for post-secondary education or vocational needs.

Attention deficit hyperactivity disorder may have an evolving impact on a child or adolescent's learning or behavioral success. It is a condition that is significantly related to each child's environment (home, school, etc.), as well as to the specific demands placed upon the child or adolescent. The ability of the individual to develop compensation skills and success over time is related to these factors, as well as the presence or absence of comorbid conditions.

## Algorithm Annotations

Recent evidence suggests that worsening clinical status during adolescence may more likely be due to environmental and/or comorbid causes, instead of inadequate psychostimulant medication dosage. The clinician should evaluate these possibilities before prescribing higher doses of stimulants to adolescents. For these reasons, close monitoring and follow-up is recommended for all children and adolescents diagnosed with ADHD, whether or not medication is utilized.

### Frequency

- Follow closely during initial medication trial by phone or clinical visit for first several weeks. Titration of dose every one to three weeks is suggested until target ADHD symptoms remit, adverse effects prevent further dose increase, or maximum dose for the stimulant medication is reached. Atomoxetine may take up to four weeks at target dose for observed response.
- Schedule a clinic visit after the initial medication trial to review care plan. The work group reviewed consensus guidelines from the American Academy of Child and Adolescent Psychiatry (2007) and the American Academy of Pediatrics (2001). Because of very little evidence, work group consensus based on community standards of care is to recommend for stimulant medications a follow-up visit within six weeks of initiation of therapy. (HEDIS measure: within four weeks)
- Once the patient is stable, schedule a clinic visit every three to six months, depending on the individual case – more frequent with significant comorbidity (*American Academy of Child and Adolescent Psychiatry, 2007 [R]*; *American Academy of Pediatrics Committee on Quality Improvement Subcommittee on Attention Deficit Hyperactivity Disorder, 2000 [R]*; *NIH Consensus Statement, 1998 [R]*).

### These visits allow for review and management of the following areas:

#### Medical

- Measurement
  - Height, weight, blood pressure, pulse
- Medication
  - Dosage, timing, coverage priorities, duration
  - Before making dosage adjustments or switching medications, the patient's adherence to current regimen should be addressed
- Positive attributes of medication
- Side effects and their management (see Table 5)
- Parent and teacher observations or behavior rating scales may be helpful
- Alternative/complementary medicine

Increasingly, parents are considering the use of alternative/complementary therapies for children with ADHD. Certain therapeutic interventions, such as the use of herbal, botanical and other nutraceutical agents, have the capacity to interact with psychotropic medications including stimulants, SSRIs and TCAs, among others. Therefore, it is important for pediatric health care providers to inquire in a non-judgmental fashion about the use of these agents by children under their care. Parents can then be educated appropriately about potential risks, benefits, side effects and drug interaction possibilities associated with a certain therapy. Such interventions are not supported by evidence-based research at this time.

**Algorithm Annotations****Psychosocial**

- Family functioning
- Home behavior management
- Peer relationships
- Outside activities

**Educational**

- ADHD symptoms
- Child-teacher relationships, social functioning, general attitude
- Academic performance, homework and study skills
- Current interventions and supports
- Review IEP or Section 504 plan if appropriate

**Psychological**

- Perception of ADHD and treatment
- Self-esteem issues
- Personal strengths and successes

**Anticipatory Guidance**

- Immediate and long-term expectations
- Study/organizational skills
- Behavior management
- Updated resources and need for advocacy
- Adolescent considerations:
  - Driving: A number of studies demonstrate an association between driving risks and impairments with ADHD (*Cox, 2008 [A]; Barkley, 2007 [R]*). The limitations of these studies include relatively small numbers of participants with ADHD, small number of female participants, and possible selection bias with more severe cases of ADHD likely being included. One larger study (*Woodward, 2000 [B]*) differentiates between mild, moderate and severe ADHD, and indicates a threefold increase in injury-related accidents in the severe category vs. the mild and moderate cases. There also seemed to be a strong association between hyperactivity-impulsivity and conduct problems with negative driving-related outcomes. "In the end, for one reason or another, it appears that adverse driving outcomes are a possibility for children with ADHD" (*Thompson, 2007 [B]*). Some authors indicate that some study impacts may not be as great as they could be because study participants were chosen from children diagnosed with ADHD at a young age and some of these participants perhaps would no longer fit the diagnosis of ADHD. Other studies indicating higher risk utilized diagnostic criteria of ADHD during adolescence.

A number of studies have indicated potential improved driving performance with long-acting methylphenidate (*Barkley, 2007 [R]*). Other newer agents have not been tested. It is advised that the physician inquire about driving abilities on and off medications.

**Algorithm Annotations**

- Nicotine: Adolescents with a lifetime diagnosis of ADHD displayed significant higher smoking activity than controls. A major component could be accounted for by deviant peer affiliations and the comorbidity with oppositional-defiant and conduct disorder (*Laucht, 2007 [B]*).
- Drug Use: In college students with a diagnosis of ADHD, "There is a strong association between the number of ADHD symptoms and tobacco, alcohol and marijuana use" (*Upadhyaya, 2008 [D]*). There is a strong association between ADHD with comorbid conditions, (e.g., oppositional-defiant disorder) and drug use. "ADHD without a comorbid externalizing disorder is not associated with an increased risk of drug abuse" (*August, 2006 [B]*).
- Substance Use: Unique characteristics regarding substance use and Inattentive Type – There is a mild association of nicotine dependence with inattentive type of ADHD but less likelihood than hyperactivity/impulsivity types (*Elkins, 2007 [B]*; *Rodriguez, 2008 [B]*). There is no association between the inattentive type of ADHD and substance use (*Elkins, 2007 [B]*).
- Misuse and diversion: Physicians should discuss with patients and parents the common misuse and diversion of stimulant medications prescribed for ADHD. One study reported lifetime rates of diversion ranging from 16%-29% of students with stimulant prescriptions (*Wilens, 2008 [M]*). Another study showed 8% intranasal use by college students during the previous six months (*Rabiner, 2009 [D]*).

**Transitioning to Adulthood**

- Despite growing interest in adult attention deficit hyperactivity disorder, little is known about predictors of persistence of childhood cases into adulthood. One recent retrospective study screened for adult ADHD 3,197 18-44 year olds diagnosed with ADHD in childhood. "Blinded clinical interviews classified 36.3% of respondents with retrospectively assessed childhood ADHD as meeting DSM-IV criteria for current ADHD. Childhood ADHD severity and childhood treatment significantly predicted persistence" (*Kessler, 2005 [D]*).
- Another recent study showed, "An average of 50% of children with ADHD (range: 32.8%-84.1% across countries) continued to meet DSM-IV criteria for ADHD as adults" (*Lara, 2009 [D]*).
- Identify post secondary education or vocational plans, and counsel patient regarding availability of academic support services.
- Identify adult health care provider to care transfer if necessary.
- Prioritize treatment to address target symptoms, level of impairment and available resources (multiple modalities frequently useful); patient participation is necessary.
- Emphasize vocational evaluation, counseling and training, as well as time management skills, organization and study skills.
- Discuss relationship issues.
- Monitor because comorbidities are common.
- Address risk of medication abuse by patient and peers.

**Table 4: Common Management Situations Might Include:**

- Breakthrough symptoms
  - Evaluate for environmental/comorbid causes, especially in adolescents
  - Increase dose
  - Shorten frequency of dose (overlap)
  - Long-acting preparation or alternative
- Homework coverage
  - Add dose late afternoon and weekend timed with homework.
- Impaired with family, peers
  - A harmonious home life and successful interactions with peers is crucial to patients with ADHD. Consider continuing doses of medication on weekends, holidays and during the summer.

**Discontinuing Medications:**

1. May be considered if stable and doing well
2. Best when there are few transitions or demands  
Avoid at beginning of any school year, especially the start of junior/senior high school
3. Trial off medication 1-4 weeks with close monitoring and follow-up

Revise multimodal care management plan as needed.

**Table 5: Management of Common Adverse Effects Associated with Stimulant Use**

<b>ADVERSE EFFECT</b>	<b>MANAGEMENT</b>
Anorexia, weight loss, stomachache	<ul style="list-style-type: none"> <li>• Administer dose with/after meals</li> <li>• High-caloric breakfast and snacks after school/bedtime</li> <li>• Limit stimulant to high priority needs</li> <li>• Consider dietitian referral for nutrition evaluation/counseling</li> </ul>
Insomnia	<ul style="list-style-type: none"> <li>• Low-stress “wind-down time” after school</li> <li>• Administer dose earlier in day</li> <li>• Discontinue afternoon/evening dose</li> <li>• Change to short-acting preparation</li> <li>• Consider adjunctive medications (e.g., clonidine, antidepressants)</li> </ul>
Rebound irritability/moodiness (usually four to five hours after last dose)	<ul style="list-style-type: none"> <li>• Overlap stimulant dosing</li> <li>• Step down dosing</li> <li>• Try long-acting or combination short-/long-acting preparations</li> </ul>
Generalized irritability, dysphoria, agitation	<ul style="list-style-type: none"> <li>• Assess timing of symptoms (e.g., peak withdrawal)</li> <li>• Consider comorbid condition</li> <li>• Reduce dose or change to long-acting preparation</li> <li>• Consider alternative/adjunctive medication (e.g., another stimulant, antidepressant)</li> </ul>
Tics (simple vocal, motor)	<ul style="list-style-type: none"> <li>• Monitor if mild, infrequent</li> <li>• Weigh benefit/risk and discuss with parents</li> <li>• Consider alternative medication (e.g., clonidine, guanfacine)</li> <li>• See Annotation #22, “Maintenance and Continuing Care,” for further information</li> </ul>
Headache	<ul style="list-style-type: none"> <li>• Assess timing</li> <li>• Reduce dose with gradual return to therapeutic dose</li> <li>• Try long-acting preparation</li> <li>• Consider alternative medication</li> </ul>
Linear growth impairment	<ul style="list-style-type: none"> <li>• Limit stimulant to high-priority needs (e.g., try weekend/vacation drug “holidays”)</li> <li>• If significant, consider alternative medication</li> <li>• See Annotation #22, “Maintenance and Continuing Care,” for further information</li> </ul>

(Ahmann, 2001 [A]; Wilens, 1992 [R])

Adherence to current regimen may be assessed by asking open-ended, non-threatening questions at each office visit. If adherence to medication regimen appears to be lacking, the patient may benefit from adher-

**Algorithm Annotations**

ence interventions. Such interventions include re-educating the patient and family about medications and how they fit into the treatment plan (including side effects and how they may be prevented.) Other ways to help adherence include regimen simplification (e.g., less-frequent dosing), use of patient adherence aids (e.g., tablet boxes, alarms), suggesting support group sessions, sending appointment reminders, cueing medication administration to daily activities (e.g., breakfast) and giving positive reinforcement for adherence efforts. Adverse effects of stimulants are not uncommon but can generally be managed in most cases. The more common side effects include anorexia, insomnia, stomachaches and headaches and, less commonly, rebound irritability, dysphoria, agitation, tics and growth impairment are seen.

It is generally felt that, in individual patients, psychostimulants may unmask or exacerbate tics. However, in two recent studies evidence suggests that psychostimulants may not be associated with tic frequency or severity. Law and Schachar studied 91 children with ADHD, with and without mild to moderate comorbid tics in a randomized, double-blind, placebo-controlled study. They found that doses of methylphenidate in the typical clinical range did not produce significantly more tics in those children than in those who received a placebo (*Law, 1999 [A]*). Furthermore, Gadow, et al., studied 34 prepubertal children with ADHD and chronic multiple tic disorder at six-month and two-year intervals, again revealing no evidence that motor or vocal tics changed in frequency or severity during maintenance therapy compared with initial evaluation (*Gadow, 1995 [A]*).

Growth suppression has been a concern with long-term use of stimulants. Recent observations/data suggest that reduced growth rates in ADHD patients treated with stimulants may occur in the first two years of treatment; however, the significance of effect on adult height acquisition is not known (*MTA Cooperative Group, 2004b [A]*; *Poulton, 2005 [R]*).

ADHD is a lifelong chronic condition. While it is common for the hyperactivity part of the condition to ameliorate throughout adolescence, there often remains (in 50%-60% of patients) significant inattentiveness, restlessness and impulsivity.

As expected, patients will be able to discontinue medication variably, depending on the severity of ADHD symptoms and their ability to compensate relative to environmental demands (e.g., school, work, family).

Poor prognostic indicators have included low intelligence, poor academic achievement, early conduct problems, poor social relationships, and family psychopathology. Many individuals, however, learn to compensate, well as to rely on their significant strengths to overcome any persisting ADHD symptoms.

(*DuPaul, 1991 [R]*; *Lambert, 1987 [C]*; *Wolraich, 1996 [R]*)

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## Brief Description of Evidence Grading

Individual research reports are assigned a letter indicating the class of report based on design type: A, B, C, D, M, R, X.

A full explanation of these designators is found in the Foreword of the guideline.

### II. CONCLUSION GRADES

Key conclusions (as determined by the work group) are supported by a conclusion grading worksheet that summarizes the important studies pertaining to the conclusion. Individual studies are classed according to the system defined in the Foreword and are assigned a designator of +, -, or  $\emptyset$  to reflect the study quality. Conclusion grades are determined by the work group based on the following definitions:

**Grade I:** The evidence consists of results from studies of strong design for answering the question addressed. The results are both clinically important and consistent with minor exceptions at most. The results are free of any significant doubts about generalizability, bias, and flaws in research design. Studies with negative results have sufficiently large samples to have adequate statistical power.

**Grade II:** The evidence consists of results from studies of strong design for answering the question addressed, but there is some uncertainty attached to the conclusion because of inconsistencies among the results from the studies or because of minor doubts about generalizability, bias, research design flaws, or adequacy of sample size. Alternatively, the evidence consists solely of results from weaker designs for the question addressed, but the results have been confirmed in separate studies and are consistent with minor exceptions at most.

**Grade III:** The evidence consists of results from studies of strong design for answering the question addressed, but there is substantial uncertainty attached to the conclusion because of inconsistencies among the results from different studies or because of serious doubts about generalizability, bias, research design flaws, or adequacy of sample size. Alternatively, the evidence consists solely of results from a limited number of studies of weak design for answering the question addressed.

**Grade Not Assignable:** There is no evidence available that directly supports or refutes the conclusion.

The symbols +, -,  $\emptyset$ , and N/A found on the conclusion grading worksheets are used to designate the quality of the primary research reports and systematic reviews:

+ indicates that the report or review has clearly addressed issues of inclusion/exclusion, bias, generalizability, and data collection and analysis;

- indicates that these issues have not been adequately addressed;

$\emptyset$  indicates that the report or review is neither exceptionally strong or exceptionally weak;

N/A indicates that the report is not a primary reference or a systematic review and therefore the quality has not been assessed.

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# Conclusion Grading Worksheet A – Annotation #14 (Medication Trial[s])

**Work Group's Conclusion:** Optimal medication management alone is superior to other modalities for the core symptoms of ADHD.

**Conclusion Grade:** I

Author/Year	Design Type	Class	Quality +,-,ø	Population Studied / Sample Size	Primary Outcome Measure(s)/Results (e.g., p-value, confidence interval, relative risk, odds ratio, likelihood ratio, number needed to treat)	Authors' Conclusions/ <i>Work Group's Comments (italicized)</i>								
MTA Cooperative Group, 2004a	RCT	A	ø	<p>-Continuation of MTA study (10 months beyond end of treatment or 24 weeks after randomized)</p> <p>-540 of the 579 originally randomized to MedMgt, behavior Beh, Comb, or CC (93% retention rate)</p> <p>-All children met criteria for ADHD-Combined type at baseline</p> <p>-Outcomes from 5 domains of effectiveness and 4 domains of services used</p>	<p>-Significant outcomes at 24 months:</p> <table border="1"> <tr> <td>Comb</td> <td>MedMgt</td> <td>Beh</td> <td>CC</td> </tr> <tr> <td>ADHD (SNAP*)1.17</td> <td>1.21</td> <td>1.38</td> <td>1.40#</td> </tr> </table> <p>(n=526)</p> <p>ODD^ (SNAP) 0.83 0.96 1.04 1.42# (n=524)</p> <p>% on Meds 86% 85% 44% 69%#</p> <p>14-24 months follow-up</p> <p>Last Dose 30.4 37.5 25.7 24.0</p> <p>reported during 14- to 24-month follow-up (n=367)</p> <p>*SNAP: parent- and teacher-rated Swanson, Nolan, &amp; Pelham Scale (lower=better)</p> <p>#Significant treatment effect (p&lt;0.01) and MTA meds vs. not (p≤0.001); Comb not different from MedMgt</p> <p>^ODD=oppositional defiant disorder</p> <p>-Non-significant differences in social skills; negative ineffective discipline factor, reading, % receiving special education, &amp; % receiving specialty mental health services</p> <p>-Use of medication during 14- to 24-month follow-up period mediated significant outcomes; differences in ADHD symptoms remained significant (p=0.002)</p> <p>-Clinically satisfactory response defined as proportion of children in each treatment group with an item mean ≤1.0 ("just a little") on a composite of parent and teacher SNAP ratings; achieved by 48% (Comb), 37% (MedMgt), 32% (Beh), and 28% (CC)</p>	Comb	MedMgt	Beh	CC	ADHD (SNAP*)1.17	1.21	1.38	1.40#	<p>-The benefits of intensive medication management for ADHD extend 10 months beyond the intensive treatment phase only in symptom domains and diminish over time.</p> <p>NOTES: analysis by intention to treat; parent and/or principal caregiver interviews were conducted at baseline; outcome measures based on parent and teacher ratings, parent interviews, and reading scores</p>
Comb	MedMgt	Beh	CC											
ADHD (SNAP*)1.17	1.21	1.38	1.40#											

Author /Year	Design Type	Class	Quality	Population Studied /Sample Size	Primary Outcome Measure(s)/ Results (e.g., p-value, confidence interval, relative risk, odds ratio, likelihood ratio, number needed to treat)	Authors' Conclusions / <i>Work Group's Comments (italicized)</i>
MTA Cooperative Group, 2004b	Non-Random	C	$\theta$	-Additional analysis of MTA study -521 of 579 originally randomized participants -Growth (weight and height) evaluated on 433 participants with data at baseline, 14 months, and 24 months -4 subgroups formed based on medication use or non-use at 14 and 24 months (Med/Med, Med/NoMed, NoMed/Med, and NoMed/NoMed) -Analysis based on change scores (from 14 to 24 months)	-255 in Med/Med group, 139 in NoMed/NoMed group, 76 in Med/NoMed group, and 51 in NoMed/Med group -Ratings of ADHD: significant change from 14 to 24 months without consideration of actual medication use (p<0.001), p=0.043 when actual medication use considered; similar result when Comb+MedMgt contrasted with Beh+CC (p value changed from 0.001 to 0.013) -Ratings of ODD: change from p=0.004 to p=0.037 when actual medication use considered in Comb+MedMgt vs. Beh+CC comparison -ADHD scores showed slight deterioration for the two groups that did not change medication status (+0.15 points for Med/Med group, +0.10 points for NoMed/NoMed group); considerable deterioration (+0.33 points) in Med/NoMed group; continued improvement (-0.15) in NoMed/Med group -Other moderator variables (comorbid anxiety, ODD, baseline severity) did not affect outcomes -During 14-month treatment phase, assigned treatment significantly related to weight and height (both p<0.001) with smaller gains in groups receiving stimulant medication; estimated height suppression was 1.23 cm/year; estimated weight suppression was 2.48 kg/year -During 10 month follow-up phase, growth suppression effects dissipated (no treatment effect and no differences in gains between groups); change in medication use mediated growth effects	-Exploratory naturalistic analyses suggest that consistent use of stimulant medication was associated with maintenance of effectiveness but continued mild growth suppression.  NOTES: incomplete growth data due primarily to unavailability of staff at all visits; differences in weight and height gain for total group estimated by comparing MedMgt and Beh groups since these groups had greatest compliance to assigned medication status
Kutcher et al., 2004	Consensus Statement	R	N/A	-Consensus statement developed in February 2002 and subsequently approved by chairman and 11 invited international experts -Treatment guidance for children and adolescents with accurate diagnosis of ADHD or hyperkinetic disorder (with or without ODD) and/or conduct disorder (CD)	-Within-subject comparisons have not found significant differences between methylphenidate (MPH) and amphetamine with regard to safety or efficacy -Psychostimulants improve core symptoms (inattention, hyperactivity, impulsivity), oppositional behavior, impulsive aggression, and social interactions with increased academic productivity and academic accuracy -No medications have been shown to be effective beyond the time period over which they were administered	-Key Messages: a. Psychostimulant medication is the first-line pharmacological treatment in cases of pure ADHD b. Treatment may need to be long-term and should provide full-day coverage, where necessary c. Use of long-acting preparations is preferable to multiple doses of short-acting preparations

Author/ Year	Design Type	Class	Qual- ity <i>+,-,0</i>	Population Studied / Sample Size	Primary Outcome Measure(s)/Results (e.g., p-value, confidence interval, relative risk, odds ratio, likelihood ratio, number needed to treat)	Authors' Conclusions/ <i>Work Group's Comments (italicized)</i>
Molina, 2009	RCT MTA Study 6and 8 year follow- up	A	+	103 children ages 7-9 with ADHD and free of conduct and learning disorders randomized to either 1) methylphenidate treatment alone; 2) or methylphenidate plus psychosocial treatment that included parent training, social skills training, academic assistance, and psychotherapy; 3) or methylphenidate treatment plus attention control.	The primary objective of this study was to test the hypothesis that ADHD symptom trajectory from years 0-3 predicts outcomes in subsequent years. Secondary outcomes were to examine functioning level of MTA study adolescents compared to non-ADHD peers.  Primary outcome measures included medication use at 6 and 8 years (group differences from years 0-3 did not persist), effects of originally randomized treatment at 8 years (no statistically significant effects of original treatment on ADHD symptoms, ODD symptoms, Antisocial behavior, impairment, depression, anxiety, academic functioning, social functioning), and rates of diagnosis of ADHD at 6 and 8 years (43.0% and 30.2%, respectively).	The authors conclude that ADHD symptom trajectory in childhood was a strong predictor of outcome 6 and 8 years later. These findings point to the need for efficacious treatments for ADHD in childhood.  It should be noted that the original MTA study (1999) found that quality medical management alone was superior to behavioral treatment and routine community care.  <i>At 6- &amp; 8-year follow-up, almost all the patients were getting only community care and no longer medications. This has led to false conclusions that meds are no longer beneficial. Previous phases of the MTA studies looked at cost-benefit ratio, which is a more reasonable factor for choosing another modality of care.</i>
Abikoff, 2005	RCT with long term follow- up MTA study	A	+	103 children with ADHD aged 7-9 years, free of conduct and learning disorders were randomized for 2 years to 1) methylphenidate alone; 2) methylphenidate + psychosocial treatment; or 3) methylphenidate plus attention control treatment.	The primary objective of this study was to compare the effect of different treatments on ADHD symptoms rate by parents, teachers and psychiatrists, and educational observations.  Significant improvement in ADHD symptoms occurred across all treatments and continued for 2 years. The multimodal treatment did not facilitate discontinuation of methylphenidate.  At the end of year 1, there were no differential treatment effects across groups for any the domains measured. Overall, only 12% continued to meet DSM-III criteria for ADHD at the end of year 1. These results persisted to the end of year 2.	The authors conclude that adding long- term psychosocial intervention to improve ADHD symptoms is not superior to medication alone. Furthermore, the benefits of methylphenidate appear to persist over time.  These results are generalizable to young, mostly white children with ADHD who are free of CD and ODD and who demonstrated some meaningful benefit with short-term medication treatment.

Author/ Year	Design Type	Class	Quality +,-,Ø	Population Studied/Sample Size	Primary Outcome Measure(s)/ Results (e.g., p- value, confidence interval, relative risk, odds ratio, likelihood ratio, number needed to treat)	Authors' Conclusions/ <i>Work Group's Comments (italicized)</i>
Van der Oord, 2007	RCT	A	Ø	50 children with ADHD ages 8-12 were randomized to treatment with methylphenidate alone or multimodal therapy for 10 weeks.	<p>The primary objective of this study was to compare the effect of each treatment arm on ADHD symptoms, oppositional behaviors, social skills, parenting stress, anxiety and self-worth.</p> <p>Both treatments conditions yielded significant improvements on all outcome domains. There were no significant differences between treatments.</p>	<p>The authors conclude that no evidence was found for the additive effect of multimodal behavior therapy compared to optimally titrated methylphenidate.</p> <p>A priori sample analysis showed that sample was large enough to detect clinically significant differences between groups. However, this study was not powered to detect more subtle differences between treatments. The results are consistent with large-scale trials such as MTA and other smaller trials.</p> <p>Interestingly, prior to randomization, 89% of parents preferred the combined treatment, which may have led to a responder-bias for combined treatment.</p>
Majewicz -Hefley, 2007	Meta analysis	M	+	Eight combined treatment studies met inclusion criteria (published between 1900 and 2004, children with ADHD, employed multimodal therapy, data for calculation of effect sizes).	<p>The objective of this meta-analysis was to calculate effect sizes for multimodal treatment of ADHD.</p> <p>Outcome measures included inattention, hyperactivity, impulsivity, social skills and academics.</p> <p>The average effect sizes for multimodal treatment were inattention, 1.27 (Standard Error 0.23); hyperactivity, 1.27 (0.24); impulsivity, 0.91 (0.17); social skills, 0.90 (0.20); and academics, 0.19 (0.09).</p>	<p>The authors conclude that this study confirms previous recommendations and provides further evidence for the use of multimodal therapy in children and adolescents with ADHD.</p> <p>An important feature of this study is that it focused on effect sizes of combined treatment only. Other meta-analyses focus on a specific single treatment and compare it to placebo. However, multimodal treatment is often compared to several different treatments, which can affect the choice of effect size statistic that is reported.</p>

Author/ Year	Design Type	Class	Qual- ity +,-,0	Population Studied / Sample Size	Primary Outcome Measure(s)/Results (e.g., p-value, confidence interval, relative risk, odds ratio, likelihood ratio, number needed to treat)	Authors' Conclusions/ <i>Work Group's Comments (italicized)</i>
Van der Oord, 2008	Meta analysis	M	+	<p>Databases were searched for articles published between 1985 and 2006 for RCTs with a behavioral component in children age 6-12 years with ADHD diagnosis.</p> <p>26 studies met the inclusion criteria for meta-analysis (data reported that allowed for effect size to be calculated, treatment in clinical setting, reported outcomes on ADHD symptoms, methylphenidate was not administered at varying doses).</p>	<p>The primary objective of this study was to compare effect sizes of methylphenidate and psychosocial treatments and their combination affect on ADHD, and concurrent oppositional, conduct, social behaviors and academic functioning.</p> <p>ADHD outcomes (rated by teachers and parents) showed large mean weighted effect sizes for both methylphenidate only and combined treatments. Psychosocial treatments alone had a moderate mean weighted effect size. Oppositional and conduct behavior symptoms showed a similar pattern. Social behavior outcomes were comparable for all treatments. All treatments had low mean effect sizes in academic functioning.</p>	<p>The authors conclude that both methylphenidate and psychosocial treatments are effective in reducing ADHD symptoms. Psychosocial treatment alone has no additional value to methylphenidate for the reduction of ADHD and teacher-rated ODD symptoms. However, for social behavior and parent-rated ODD, all treatments were equally effective. For improvement of academic functioning, no treatment was effective.</p> <p>The authors further conclude that psychosocial treatments alone are just as effective as other treatments in terms of improved social behavior and reducing ODD/CD symptoms. For reduction of ADHD core symptoms, methylphenidate alone or in combination with psychosocial treatment are more effective.</p> <p>It should be noted that in this meta-analysis, effect sizes were change scores calculated with pre-post effect sizes and standard deviations of one treatment condition. The effect sizes were not calculated using a comparison of a control group and a treatment group. For this reason, weighted mean effect sizes are reported.</p>

This section provides resources, strategies and measurement specifications for use in closing the gap between current clinical practice and the recommendations set forth in the guideline.

The subdivisions of this section are:

- Priority Aims and Suggested Measures
  - Measurement Specifications
- Key Implementation Recommendations
- Knowledge Resources
- Resources Available

## Priority Aims and Suggested Measures

1. Increase the use of DSM-IV-TR or DSM-PC criteria for diagnosing attention deficit hyperactivity disorder. (*Annotation #4*)

Possible measure of accomplishing this aim:

- a. Percentage of patients newly diagnosed with ADHD whose medical record contains documentation of DSM-IV-TR or DSM-PC criteria.

2. Increase screening for other comorbidities in patients newly diagnosed with attention deficit hyperactivity disorder. (*Annotation #5*)

Possible measure of accomplishing this aim:

- a. Percentage of patients newly diagnosed with ADHD whose medical record contains documentation of screening for other primary conditions and comorbidities, as defined in the guideline (for example, depression, anxiety, oppositional-defiant disorder).

3. Improve the primary care use of FDA approved ADHD medications with indications for management of patients with ADHD. (*Annotation #14*)

Possible measures of accomplishing this aim:

- a. Percentage of patients diagnosed with ADHD who have cardiovascular history assessed before psychostimulant medication is prescribed.
- b. Percentage of patients treated with psychostimulant medication for the diagnosis of ADHD whose medical record contains documentation of a follow-up visit at least twice a year.

4. Improve primary care communication with parents and school in treatment planning for children with ADHD. (*Annotations #19, 21*)

Possible measures of accomplishing this aim:

- a. Percentage of patients diagnosed with ADHD whose medical record contains documentation that they discussed parental resources for managing children with ADHD (e.g., parent training groups, videos, books, psychology referral).
- b. Percentage of patients diagnosed with ADHD whose medical record contains documentation that the clinician discussed the need for school-based supports and educational service options for children with ADHD.
- c. Percentage of patients with initial diagnosis of ADHD whose medical record contains documentation of communication between the primary care provider and school.

## **Measurement Specifications**

### **Possible Success Measure #1a:**

Percentage of patients newly diagnosed with ADHD whose medical record contains documentation of DSM-IV-TR or DSM-PC criteria.

### **Population Definition**

All children and adolescents from kindergarten through 12th grade (ages 5 to 18) diagnosed with ADHD.

### **Data of Interest**

# of medical records of newly diagnosed ADHD patients with documentation of DSM-IV-TR or DSM-PC criteria

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Total # of medical records of newly diagnosed ADHD patients reviewed

### **Numerator/Denominator Definitions**

**Numerator:** ADHD is defined as ICD-9 codes of 314.00 or 314.01. Newly diagnosed is defined as documented ADHD in past six months and no documentation of ADHD codes in the previous 6-12 months. Documented is defined as any evidence in the medical record that DSM-IV-TR or DSM-PC criteria were addressed. DSM-IV-TR or DSM-PC criteria include evaluation for :

1) symptoms, 2) onset, 3) duration, 4) pervasiveness and 5) impairment.

**Denominator:** ADHD is defined as ICD-9 codes of 314.00 or 314.01. Newly diagnosed is defined as documented ADHD in past six months and no documentation of ADHD codes in the previous 6-12 months.

### **Method/Source of Data Collection**

Medical groups may identify their patient samples in several ways. One way is to use available information systems to identify patients with ADHD from all payers. A minimum sample of 10 charts is suggested.

### **Time Frame Pertaining to Data Collection**

Suggested data collection time frame is monthly.

### **Notes**

Depending upon the size of the medical group's ADHD population, data may be collected on a less frequent basis.

**Priority Aims and Suggested Measures**

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**Possible Success Measure #3b:**

Percentage of patients treated psychostimulant with medication for the diagnosis of ADHD whose medical record contains documentation of a follow-up visit at least twice a year.

**Population Definition**

All children and adolescents from kindergarten through 12th grade (ages 5 to 18) diagnosed with ADHD.

**Data of Interest**

# of medical records of ADHD patients on psychostimulant medication with documentation of at least two follow-up visits within the previous year

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Total # of ADHD patients on psychostimulant medication whose medical records are reviewed

**Numerator/Denominator Definitions**

**Numerator:** ADHD is defined as ICD-9 codes of 314.00 or 314.01. Diagnosed is defined as documented ADHD in the previous 6-12 months. Documented is defined as any evidence in the medical record that at least two follow-ups visit occur within the previous year. A follow-up visit for ADHD includes documentation of the following twice a year: height, weight, a discussion of medication, a discussion of school progress, and a care plan should be identified.

**Denominator:** ADHD is defined as ICD-9 codes of 314.00 or 314.01. Diagnosed is defined as documented ADHD in the past 6-12 months.

**Method/Source of Data Collection**

Medical groups may identify their patient samples in several ways. One way is to use available information systems to identify patients with ADHD from all payers. A minimum sample of 10 charts is suggested. It is recommended that a chart review be done to determine follow-up visits for ADHD.

**Time Frame Pertaining to Data Collection**

Suggested data collection time frame is monthly.

**Notes**

Depending upon the size of the medical group's ADHD population, data may be collected on a less frequent basis.

**Priority Aims and Suggested Measures**

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**Possible Success Measure #4b:**

Percentage of patients diagnosed with ADHD whose medical record contains documentation that the clinician discussed the need for school-based supports and educational service options for children with ADHD.

**Population Definition**

All children and adolescents from kindergarten through 12th grade diagnosed with ADHD.

**Data of Interest**

# of medical records of ADHD patients with documentation of discussion of the need for school-based supports and educational service options

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Total # of ADHD patients whose medical records are reviewed

**Numerator/Denominator Definitions**

Numerator: ADHD is defined as ICD-9 codes of 314.00 or 314.01. Diagnosed is defined as documented ADHD in the previous 6-12 months. Documented is defined as any evidence in the medical record that a clinician discussed school-based supports and educational service options.

Denominator: ADHD is defined as ICD-9 codes of 314.00 or 314.01. Diagnosed is defined as documented ADHD in the past 6-12 months.

**Method/Source of Data Collection**

Medical groups may identify their patient samples in several ways. One way is to use available information systems to identify patients with ADHD from all payers. A minimum sample of 10 charts is suggested.

**Time Frame Pertaining to Data Collection**

Suggested data collection time frame is monthly.

**Notes**

Depending upon the size of the medical group's ADHD population, data may be collected on a less frequent basis.

## Key Implementation Recommendations

The following system changes were identified by the guideline work group as key strategies for health care systems to incorporate in support of the implementation of this guideline.

1. Evaluation for key features of ADHD using the DSM-IV-TR/DSM-PC criteria should include information from multiple sources such as parents/caregivers, the child and school personnel, and should be documented in the patient medical record.
2. Results of the evaluation are critical to identify appropriate treatment options and resources.
3. Develop processes that allow for consistent documentation and monitoring of diagnosis and management of ADHD.
4. Develop a process for follow-up assessment and success in management of ADHD for primary care provider, parents and school.
5. Develop a process for consistent documentation and monitoring of medication.
6. Develop a process to key the primary care physician at the time of or near puberty that anticipatory guidance and transition into adulthood discussion should take place.

## Knowledge Resources

### Criteria for Selecting Resources

The following resources were selected by the Diagnosis and Management of ADHD guideline work group as additional resources for providers and/or patients. The following criteria were considered in selecting these resources.

- The site contains information specific to the topic of the guideline.
- The content is supported by evidence-based research.
- The content includes the source/author and contact information.
- The content clearly states revision dates or the date the information was published.
- The content is clear about potential biases, noting conflict of interest and/or disclaimers as appropriate.

### Resources Available to ICSI Members Only

ICSI has a wide variety of knowledge resources that are *only* available to ICSI members (these are indicated with an asterisk in far left-hand column of the Resources Available table). In addition to the resources listed in the table, ICSI members have access to a broad range of materials including tool kits on CQI processes and Rapid Cycling that can be helpful. To obtain copies of these or other Knowledge Resources, go to [http://www.icsi.org/improvement\\_resources](http://www.icsi.org/improvement_resources). To access these materials on the Web site, you must be logged in as an ICSI member.

The resources in the table on the next page that are not reserved for ICSI members are available to the public free-of-charge.

## Resources Available

*	Author/Organization	Title/Description	Audience	Web Sites/Order Information
	ADD Warehouse	Online catalog of ADD/ADHD resources, books, videos, training, and assessment products.	Patients and Families Health Care Professionals	<a href="http://www.addwarehouse.com">http://www.addwarehouse.com</a> or call 1-800-233-9273
	ADHD Med Tracking (AMT)	An Internet-based service for providers to assess and monitor the ongoing medical treatment of children with attention deficit hyperactivity disorder.	Health Care Professionals	<a href="http://www.kids4health.net/">http://www.kids4health.net/</a>
	American Academy of Child and Adolescent Psychiatry	Professional organization Web site addresses wide range of psychiatric conditions in children and adults including ADHD. Includes information on clinical trials, past and upcoming conferences regarding ADHD. Family resources includes policy statements and fact sheets on ADHD and related conditions.	Patients and Families Health Care Professionals	<a href="http://www.aacap.org">http://www.aacap.org</a>
	American Academy of Pediatrics	Professional organization Web site provides information on clinical trials, research findings, consensus statements regarding ADHD diagnosis and management, conferences and seminars.	Health Care Professionals	<a href="http://www.aap.org">http://www.aap.org</a>
	Attention Deficit Disorder Association	General resource containing comprehensive information on ADHD. Six essays under the ABC's of ADHD may be particularly helpful to parents, educators and others who work with children with ADHD.	Patients and Families	<a href="http://www.add.org">http://www.add.org</a>
	Children and Adults with Attention Deficit Disorders (CHADD)	The organization is composed of dedicated volunteers from around the country who play an integral part in the association's success by providing support, education and encouragement to parents, educators and professionals on a grassroots level through CHADD chapters. Along with its growth in membership and reputation, CHADD has retained the passion and commitment of its founders.	Patients and Families; Health Care Professionals	<a href="http://www.chadd.org">http://www.chadd.org</a>

\* Available to ICSI members only.

**Resources Available**

*	Author/Organization	Title/Description	Audience	Web Sites/Order Information
	The Council for Exceptional Children	The Council for Exceptional Children (CEC) is the largest international professional organization dedicated to improving educational outcomes for individuals with exceptionalities, students with disabilities, and/or the gifted. CEC advocates for appropriate governmental policies, sets professional standards, provides continual professional development, advocates for newly and historically underserved individuals with exceptionalities, and helps professionals obtain conditions and resources necessary for effective professional practice.	Health Care Professionals	<a href="http://www.cec.sped.org">http://www.cec.sped.org</a>
*	Colleen Dobie, Allina Medical Clinic	Screening for ADHD Medications	Health Care Professionals	<a href="http://www.icsi.org/improvement_resources/knowledge_resources/tools/">http://www.icsi.org/improvement_resources/knowledge_resources/tools/</a>
	K12 Academics	This Web site is based out of the U.S. Library of Congress. The Web site offers information around the history of the diagnosis of ADHD, characteristics of patients with ADHD, symptoms and treatments. While some of the treatments are controversial, it is clearly stated that some treatments have not yet been backed up by evidence.	Patients and Families; Health Care Professionals	<a href="http://www.k12academics.com/addadhd.htm">http://www.k12academics.com/addadhd.htm</a>
	National Committee for Quality Assurance (NCQA)	Performance Improvement CME activity to evaluate how well your practice manages pediatric ADHD patients. Includes resources to improve care and overcome common barriers to ADHD treatment.	Health Care Professionals	<a href="http://www.ncqaqiconnection.org">http://www.ncqaqiconnection.org</a>
	National Institute of Mental Health	General resource for ADHD, as well as psychological comorbidities. Includes clinical trial information, fact sheets, brochures and books to be ordered or directly downloaded.	Patients and Families; Health Care Professionals	<a href="http://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml">http://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml</a>

\* Available to ICSI members only.

**Resources Available**

*	Author/Organization	Title/Description	Audience	Web Sites/Order Information
	PACER Center, Inc. (Parent Advocacy for Children's Educational Rights)	The mission of PACER Center is to expand opportunities and enhance the quality of life of children and young adults with disabilities and their families, based on the concept of parents helping parents. With assistance to individual families, workshops, materials for parents and professionals, and leadership in securing a free and appropriate public education for all children, PACER's work affects and encourages families in Minnesota and across the nation.	Patients and Families	<a href="http://www.pacer.org">http://www.pacer.org</a>

\* Available to ICSI members only.