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Health Care Guideline

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

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ICSI
Institute for Clinical Systems Improvement

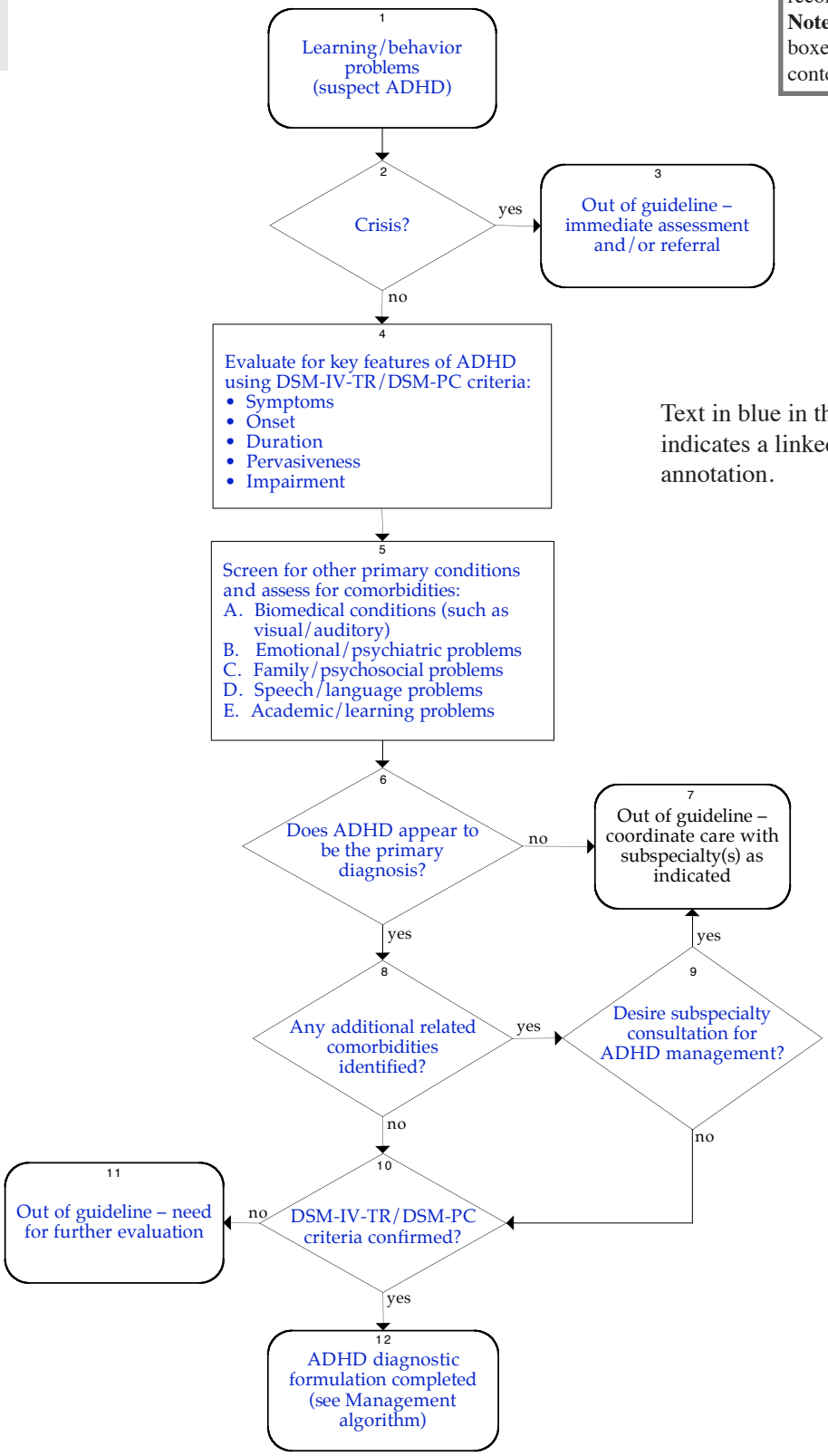
Health Care Guideline:

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

Ninth Edition
March 2012

Evaluation Algorithm

EBR = Evidence-based recommendation included
Note: Not all numbered boxes have annotated content



Text in blue in this algorithm indicates a linked corresponding annotation.

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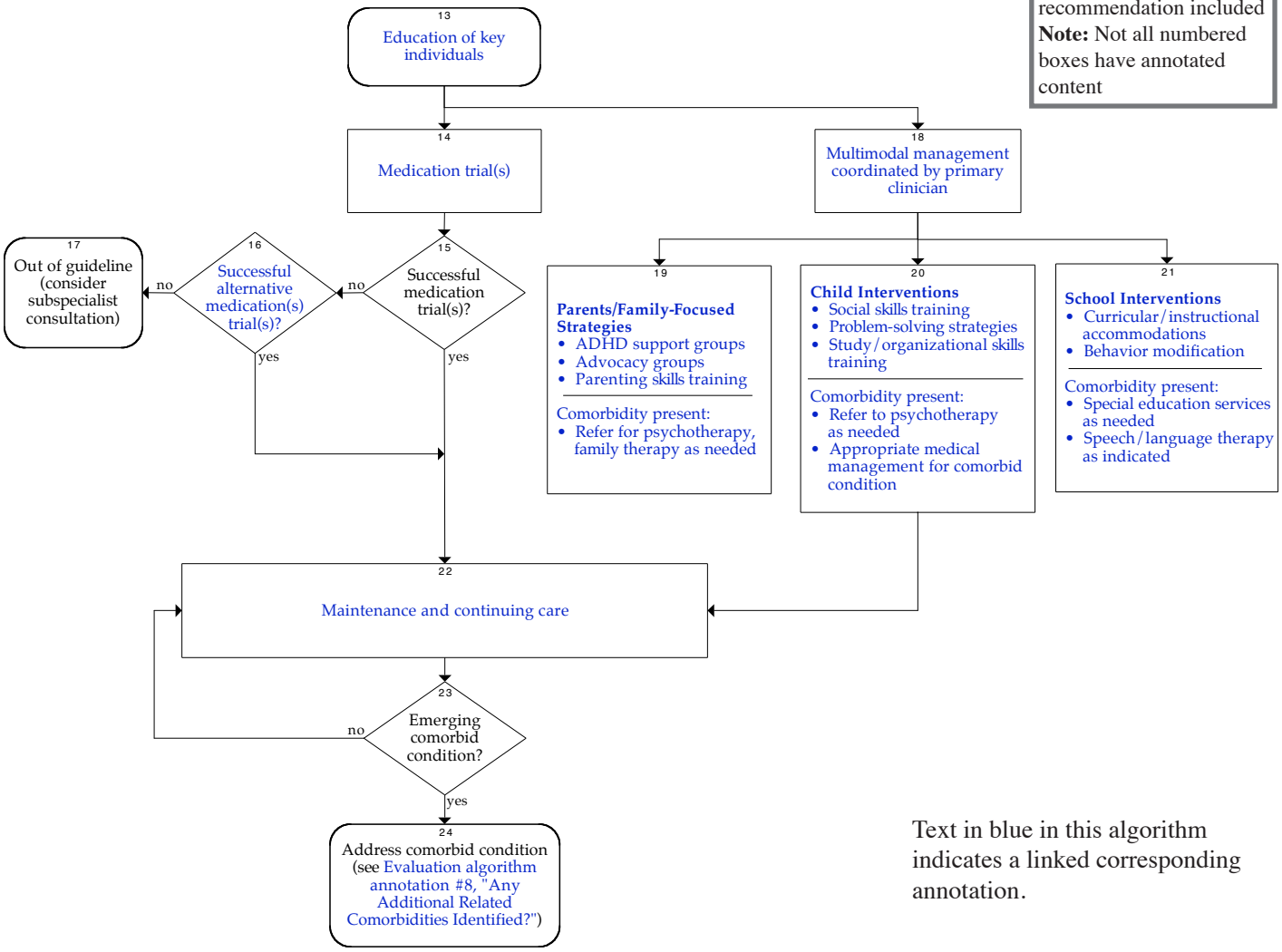
Management Algorithm

EBR = Evidence-based recommendation included
Note: Not all numbered boxes have annotated content



Text in blue in this algorithm indicates a linked corresponding annotation.

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Evidence Grading

Literature Search

A consistent and defined process is used for literature search and review for the development and revision of ICSI guidelines. The literature search was divided into two stages to identify systematic reviews, (stage I) and randomized controlled trials, meta-analysis and other literature (stage II). Literature search terms used for this revision are below and include literature from January 2009 through October 2011.

Search terms included keywords ADHD, IntunIV, inattention, impulsivity, disorganization, organize – (includes all suffixes), hyperactivity, ADHD assessment, sleep, iron, ferritin, "restless leg." MeSH terms included Attention Deficit Disorder with Hyperactivity (MaJR) as primary topic of article, Attention Deficit Disorder with Hyperactivity/drug therapy, ferritins, iron, sleep, sleep disorders. Inclusion criteria were children, adolescents, randomized controlled trials, guidelines, systematic reviews and meta-analysis. PubMed was the database used.

GRADE Methodology

Following a review of several evidence rating and recommendation writing systems, ICSI has made a decision to transition to the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system.

GRADE has advantages over other systems including the current system used by ICSI. Advantages include:

- developed by a widely representative group of international guideline developers;
- explicit and comprehensive criteria for downgrading and upgrading quality of evidence ratings;
- clear separation between quality of evidence and strength of recommendations that includes a transparent process of moving from evidence evaluation to recommendations;
- clear, pragmatic interpretations of strong versus weak recommendations for clinicians, patients and policy-makers;
- explicit acknowledgement of values and preferences; and
- explicit evaluation of the importance of outcomes of alternative management strategies.

This document is in transition to the GRADE methodology

Transition steps incorporating GRADE methodology for this document include the following:

- Priority placed upon available Systematic Reviews in literature searches.
- All existing Class A (RCTs) studies have been considered as high quality evidence unless specified differently by a work group member.
- All existing Class B, C and D studies have been considered as low quality evidence unless specified differently by a work group member.
- All existing Class M and R studies are identified by study design versus assigning a quality of evidence. Refer to Crosswalk between ICSI Evidence Grading System and GRADE.
- All new literature considered by the work group for this revision has been assessed using GRADE methodology.

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Crosswalk between ICSI Evidence Grading System and GRADE

ICSI GRADE System	Previous ICSI System	
High, if no limitation **Moderate**, if some limitations **Low**, if serious limitations	**Class A:**	Randomized, controlled trial
Low	**Class B:**	[observational] Cohort study
	Class C:	[observational] Non-randomized trial with concurrent or historical controls
Low		Case-control study
Low		Population-based descriptive study
***Low**		Study of sensitivity and specificity of a diagnostic test
* Following individual study review, may be elevated to Moderate or High depending upon study design		
	Class D:	[observational]
Low		Cross-sectional study Case series Case report
Meta-analysis	**Class M:**	Meta-analysis
Systematic Review		Systematic review
Decision Analysis		Decision analysis
Cost-Effectiveness Analysis		Cost-effectiveness analysis
Low	**Class R:**	Consensus statement
Low		Consensus report
Low		Narrative review
Guideline		Guideline
Low	**Class X:**	Medical opinion

Evidence Definitions:

High Quality Evidence = Further research is very unlikely to change our confidence in the estimate of effect.

Moderate Quality Evidence = Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low Quality Evidence = Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate or any estimate of effect is very uncertain.

In addition to evidence that is graded and used to formulate recommendations, additional pieces of literature will be used to inform the reader of other topics of interest. This literature is not given an evidence grade and is instead identified as a **Reference** throughout the document.

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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.

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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.

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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)*

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Clinical Highlights

- 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)*

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Implementation Recommendation Highlights

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.

- Evaluation for key features of ADHD using the DSM-IV-TR/DSM-PC criteria must include information from multiple sources such as parents/caregivers, the child and school personnel, and must be documented in the patient medical record.
- Results of the evaluation are critical to identify appropriate treatment options and resources.
- Develop processes that allow for consistent documentation and monitoring of diagnosis and management of ADHD.
- Develop a process for follow-up assessment and success in management of ADHD for primary care provider, parents and school.
- Develop a process for consistent documentation and monitoring of medication.
- 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.

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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.

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Definitions

Algorithm – A problem-solving process to be followed.

Alpha-2 agonist – A drug that binds to and stimulates alpha-2 adrenergic receptors.

Apnea-hypopnea index (AHI) – An index used to assess the severity of sleep apnea, combining apnea (pauses in breathing) and hypopnea (shallow breathing causing drop in airflow).

Apraxia – Loss of ability to perform learned tasks or movements as requested.

Biobehavioral – Relating to the interrelationships among psychosocial, behavioral and biological processes.

Biopsychosocial – Concerning the biological, psychological and social aspects of diseases or conditions.

Cardiac arrhythmias – Difficulties with the rate or rhythm of a heartbeat.

Cardiomyopathy – Enlargement, weakness and deterioration of function of the heart muscle.

Central Auditory Processing Disorder – Difficulty processing and remembering a variety of language related tasks.

Clinician – All health care professionals whose practice is based on interaction with and/or treatment of a patient.

Comorbidities – Two or more co-existing medical conditions.

Coprolalia – Involuntary utterance of socially inappropriate words.

DSM-IV-TR – Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision.

DSM-PC – The Diagnostic and Statistical Manual for Primary Care.

Dysfluency – Impairment of the ability to produce smooth, fluent speech.

Dysphoria – An emotional state marked by anxiety, depression, along with disquiet, discomfort or restlessness.

Dysrhythmia – Abnormality or disturbance of a normally rhythmic pattern (cardiac, brain waves, speech).

Dysthymia – Chronic low level of depression.

ICD-9 codes – International Classification of Diseases, Functioning, and Disability – diagnosis codes used for medical billing and data collecting.

Meta-analysis – A systematic method using statistical data analysis to integrate results of several studies of the same issue.

Mood lability – Frequent or intense mood/emotional shifts.

Neurofeedback – Training of brain function by monitoring electrical brain activity and learning self-regulation techniques.

Neuromaturational – Gradual unfolding of development over the life course.

Nutraceutical – A food substance that provides medical or health benefits.

Pathognomonic – Cistinctly characteristic of a particular disease or condition.

Pharmacologic – Concerning the uses, effects, and modes of action of medications.

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Phonological disorder – A type of speech articulation disorder including not using speech sounds expected for age group, or patterns of error of sound use.

Prefrontal cortex – The anterior part of the frontal lobes of the brain, responsible for controlling executive functions, cognitive analysis and abstract thought.

Presynaptic norepinephrine transporter – A protein in a nerve ending that decreases the concentration of norepinephrine near the junction.

Presynaptic terminals – Central and peripheral nerve fiber endings that are specialized for the release of neurotransmitters.

Psychopathology – Study or manifestation of mental illness and abnormal behavior.

Psychostimulants – Drugs that stimulate the central nervous system and induce temporary improvement in mental and/or physical function.

SSRI – Selective serotonin reuptake inhibitor.

Sternotomy – An incision into or through the sternum.

Sympathomimetic – Mimicking the effects of transmitter substances of the sympathetic nervous system.

Synapse – A junction in the nervous system allowing a nerve impulse to travel between neurons.

TCA – Tricyclic antidepressant.

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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).

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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.

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Algorithm Annotations

Evaluation Algorithm Annotations

1. Learning/Behavior Problems (Suspect ADHD)

Recommendations:

- Consider ADHD evaluation if child presents with concerns regarding learning problems, behavior problems or specifically ADHD.
- Recognize that 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

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- 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 [Low Quality Evidence])*. 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 combined type being seen most often in the school-age child *(Applegate, 1997 [Low Quality Evidence])*.

The impact of ADHD symptoms on functioning of individuals in the adolescent age group can be particularly confusing *(Reiff, 1998 [Low Quality Evidence], Barkley, 1990b [Low Quality Evidence])*. 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 dropout. 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.

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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?

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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, e.g., appointment with mental health provider, social services, physician or 911.

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

Recommendations:

- Incorporate information from multiple sources such as parents, other caregivers, the child and school personnel in the evaluation of primary ADHD symptoms. Document this information in the patient medical record.
- Determine ADHD subtype (Predominantly Inattentive Type, Predominately Hyperactive-Impulsive Type, Combined Type) based on the criteria met by presenting symptoms.
- 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 [Low Quality Evidence])*. 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 [Low Quality Evidence])*

- 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 [Low Quality Evidence]; Conners, 1998b [Low Quality Evidence])*

- Multiple scales assessing conduct, learning, psychosomatic, impulsive/hyperactive, and anxiety dimensions
- Some concern regarding few items focusing on cognitive (inattention) versus the 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)
- Achenbach Teacher Report Form (TRF)
- Achenbach Youth Self-Report
- Devereaux Scales of Mental Disorders (DSMD)
- Behavioral Assessment System for Children (BASC)

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

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 Psychiatric Association, 2000 [Reference])*. 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 developmental 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 *(Wolraich, 1996 [Reference])*.

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).

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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.

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5. Screen for Other Primary Conditions and Assess for Comorbidities

Recommendations:

- Recognize that common ADHD symptoms (inattention, hyperactivity, disruptive behavior, academic difficulty) may result from a number of other difficulties.
- Acknowledge that 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 [Low Quality Evidence])*.

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 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, 1992 [Low Quality Evidence]; Biederman, 1991 [Low Quality Evidence]; Cantwell, 1987 [Low Quality Evidence])*. 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), Achenbach Teacher Report Form (TRF), Achenbach 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 [Low Quality Evidence])

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.

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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

Recommendations:

- 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.

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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 *(Wender, 1995 [Low Quality Evidence]; Kelly, 1992 [Low Quality Evidence]; Murphy, 1992 [Low Quality Evidence])*.

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 [Low Quality Evidence])*

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

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- 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 *(O'Brien, 2003 [Low Quality Evidence]; Chervin, 2002 [Low Quality Evidence])*. Sleep should be thoroughly evaluated.

    Sleep difficulties are common in children with ADHD. A meta-analysis of subjective and objective studies looking at children with ADHD and controls found that parents of ADHD children reported significantly higher bedtime resistance, more sleep onset difficulties, nighttime wakenings, difficult morning wakenings, sleep disordered breathing and daytime sleepiness compared to controls. Objective studies found significantly higher sleep onset latency, the number of stage shifts/hour sleep, and the apnea-hypopnea index in children with ADHD compared to controls *(Cortese, 2009 [Meta-analysis])*.

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B. Emotional/Psychiatric Problems

Recommendations:

- Screen for comorbid conditions of depression, anxiety disorders, conduct disorder and substance abuse during the interview with the patient.
- Consider treating the ADHD symptoms presenting in children with autism spectrum disorders. (Autism treatment is out of guideline.)

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%. 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 [Low Quality Evidence]; Geller, 2002 [Low Quality Evidence]; Giedd, 2000 [Low Quality Evidence]; Faraone, 1997 [Low Quality Evidence]; Jensen, 1997 [Low Quality Evidence]; Wozniak, 1995 [Low Quality Evidence]; Spitzer, 1994 [R]; Werry, 1987 [Low Quality Evidence])*. 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 may be 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 even 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 [Low Quality Evidence])*.

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

- Childhood mania – Juvenile Bipolar Disorder is episodic and extremely rare when compared to ADHD.
- Patient may experience 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.

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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.
- 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

Recommendations:

- Evaluate chronic or acute stress that may cause changes in a child's academic or behavioral functioning.
- 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 *(Spencer, 1996 [Low Quality Evidence]; Jensen, 1993 [Low Quality Evidence]; Simeon, 1993 [Low Quality Evidence]; Rostain, 1991 [Low Quality Evidence]).*

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 *(Biederman, 2008 [Low Quality Evidence]; Geller, 2007 [Low Quality Evidence]).*

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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;
- 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?

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D. Speech/Language Problems

Recommendations:

- 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.
- If speech and language problems suggestive of a pervasive developmental disorder are present, refer the child to a diagnostic team including developmental or mental health professionals and a speech and language pathologist.
- Assess voice quality as children with ADHD are at higher risk for "vocal cord abuse." When a child is found to have a chronic raspy or hoarse vocal quality, refer to an otolaryngologist to look for vocal cord pathology such as vocal cord thickening or vocal cord nodules.
- If the child presents with symptoms of repetitive noises (throat clearing, sniffing, barking, or coprolalia) suggestive of Tourette's syndrome, consider consultation by a pediatric neurologist, developmental and behavioral pediatrician, or child psychiatrist.

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 *(Giddan, 1991 [Low Quality Evidence]; Cantwell, 1981 [Low Quality Evidence])*. 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 *(Giddan, 1991 [Low Quality Evidence]; Cantwell, 1981 [Low Quality Evidence])*.

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.

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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 [Low Quality Evidence])*. 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,
- 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 syndrome 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

Recommendation:

- 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 executive function 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,
- 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.

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6. Does ADHD Appear to Be the Primary Diagnosis?

Recommendation:

- If ADHD is likely a primary diagnosis and a comorbid condition is suspected, consider moving to Annotation #10, confirming the DSM-IV-TR/DSM-PC criteria, but treat the comorbid condition as having equal importance with ADHD.

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 the Evaluation Algorithm 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.

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8. Any Additional Related Comorbidities Identified?

Recommendation:

- Screen for comorbid conditions that occur commonly with ADHD.

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.

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9. Desire Subspecialty Consultation for ADHD Management?

Recommendation:

- ADHD with comorbidities may need appropriate subspecialty consultation.

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.

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

Recommendation:

- Accurate diagnosis requires confirmation of DSM-IV-TR/DSM-PC criteria.

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.

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11. Out of Guideline – Need for Further Evaluation

Recommendation:

- Patients who fall outside of this guideline should be monitored and/or have subspecialty consultation.

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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.

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12. ADHD Diagnostic Formulation Completed

Recommendation:

- Discuss the diagnosis with family in detail, including the child's functioning at school, home and in the community.

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 *(Reiff, 1993 [Low Quality Evidence]; Garfinkel, 1992 [Low Quality Evidence])*. 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.

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Management Algorithm Annotations

13. Education of Key Individuals

Recommendation:

- Provide appropriate information about the new ADHD diagnosis for the child, the family and his/her educators.

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 Quality Improvement Support section for specific recommended educational materials and resources directed to parents, children and adolescents, and teachers.

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14. Medication Trial(s)

Recommendations:

- Prescribe FDA-approved treatments for ADHD in children, including psychostimulants and/or non-stimulants.
- Obtain cardiology consultation for 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 and/or atomoxetine.
- Review the personal and family cardiovascular history, and complete a physical examination of each patient prior to starting stimulant therapy and/or atomoxetine. Medication history or physical exam changes consistent with possible cardiac disease during treatment with stimulant medication and/or atomoxetine may require additional evaluation by a cardiologist.

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 [Low Quality Evidence])*.

Optimal medication management alone is superior to other modalities for the core symptoms of ADHD.

Stimulants increase the availability of neurotransmitters at presynaptic terminals. Non-stimulant atomoxetine affects the presynaptic norepinephrine transporter, increasing norepinephrine, while guanfacine is a 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. The FDA reports that stimulant products and atomoxetine should generally not be used in patients with serious heart problems.

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

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.

An open-label, multisite study of methylpheridate 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 [Low Quality Evidence])*.

A placebo-controlled, double-blind study *(Newcorn, 2008 [High Quality Evidence])* shows response rates of 45% for amoxetine and 56% for methylphenidate, both superior to placebo response at 24%. The focus study *(Starr, 2005 [Low Quality Evidence])* 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

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predominantly hyperactive, have shown more positive response at moderate to high doses of methylphenidate. Please refer to Table 2, "Summary of FDA-Approved ADHD Medications for Use in Children and Adolescents," in Annotation #14 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 [Low Quality Evidence])*.

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

Current evidence does not support a higher risk of sudden cardiac death with stimulant medication compared to the general population *(Cooper, 2011 [High Quality Evidence])*. However, certain conditions may place a patient at higher risk for such an outcome. All patients should receive a thorough cardiovascular personal/family history and physical exam before initiating stimulant medication and/or atomoxetine, with an emphasis on identifying risk factors for sudden death. A routine ECG on all patients is not recommended *(Warren, 2009 [Meta-analysis])*. See Appendix A, "Screening Tool for Sudden Death Cardiac Risk Factors among Children Starting Stimulant Medication."

Cardiology consultation should be obtained prior to the use of stimulant medication and/or atomoxetine in patients with known structural cardiac abnormalities, cardiomyopathy, serious cardiac arrhythmias, coronary artery disease, or other serious cardiac problems.

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 [Moderate Quality Evidence])*.

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

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 [Low Quality Evidence])*. Side effects of guanfacine include somnolence, headache, fatigue and sedation *(Salle, 2009 [Low Quality Evidence])*.

Extended-release guanfacine (Intuniv®) and extended-release clonidine (Kapvay®) are the first ADHD medications to achieve FDA approval as adjunctive therapy with stimulant medications. A randomized control trial by Kollins, et al. in 2011 looked at placebo versus extended-release clonidine as adjunctive therapy in patients currently taking stimulant medication. They found clinically significant improvement of overall ADHD symptoms (total ADHD-RS-IV score) in clonidine XR group versus placebo that started in week two and continued into week eight *(Kollins, 2011 [High Quality Evidence])*.

Extended-release guanfacine is the first ADHD medication to look for improvement of oppositional symptoms in addition to ADHD core symptoms. A randomized, double-blind placebo controlled trial, by Connor, et al. in 2010, using extended-release guanfacine as monotherapy for nine weeks showed clinically significant reduction of ADHD-RS-IV total score beginning in week two. They also found clinically significant reduction in the Connors' Parent Rating Scale oppositional subscale beginning in week three *(Connor, 2010 [High Quality Evidence])*. It is the ICSI work group's consensus that other alpha agonists would likely have the similar effects upon oppositional symptoms; however, they have not been specifically studied to date.

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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. (Multiple updates and warnings can be found at http://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/ucm107912.htm.) The labeling has been updated with a boxed warning.

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

Medications	Dosage Form	Strengths (mg)	Extended-Release Mechanism	Predominant Adverse Effects	Comments
Amphetamine-Dextroamphetamine Mixed Salts					
Immediate-release					
Adderall®, generic[1]	Immediate-release tablet	5, 7.5, 10, 12.5, 15, 20, 30	---	Decreased appetite, insomnia, headaches, increased HR	• Tablets contain d-amphetamine and l-amphetamine salts in a 3:1 ratio • As dose increases, duration of action is extended
Extended-release					
Adderall XR®, generic	Extended-release bead-filled capsule	5, 10, 15, 20, 25, 30	50% of dose released immediately; 50% of dose is delayed-release and delivered gradually over a prolonged period	Decreased appetite, insomnia, headaches, increased HR	• Capsules contain d-amphetamine and l-amphetamine salts in a 3:1 ratio • Capsule may be opened and contents sprinkled on soft food and swallowed without chewing[2]
Dexmethylphenidate					
Immediate-release					
Focalin®, generic	Immediate-release tablet	2.5, 5, 10	---	Headache, decreased appetite, restlessness, abdominal pain, increased HR	• Give doses at least 4 hours apart • For conversion from methylphenidate, initiate at half the total daily dose
Extended-release					
Focalin XR®	Extended-release bead-filled capsule	5, 10, 15, 20, 25, 30, 35, 40	50% of dose released immediately; 50% of dose is delayed-release and delivered gradually over a prolonged period	Headache, decreased appetite, restlessness, abdominal pain, increased HR	• For conversion from methylphenidate, initiate at half the total daily dose • For conversion from immediate-release Focalin® to XR, use same daily dose • Capsule may be opened and contents sprinkled on soft food and swallowed without chewing[2]
Dextroamphetamine					
Immediate-release					
Dexedrine®, generic	Immediate-release tablet	5, 10	---	Decreased appetite, insomnia, headaches, increased HR	• Typical dextroamphetamine dose is approximately half of the equivalent methylphenidate dose
Extended-release					
Dexedrine Spansule®, generic	Extended-release bead-filled capsule	5, 10, 15	50% of dose released immediately; 50% of dose is delayed-release and delivered gradually over a	Decreased appetite, insomnia, headaches, increased HR	• Typical dextroamphetamine dose is approximately half of the equivalent methylphenidate dose

See footnotes at the end of the table.

Medications	Dosage Form	Strengths (mg)	Extended-Release Mechanism	Predominant Adverse Effects	Comments
Lisdexamfetamine					
Vyvanse®	Oral capsule	20, 30, 40, 50, 60, 70	---	Insomnia, headache, nervousness, dizziness, irritability, increased HR/BP	• Prodrug of dextroamphetamine • Contents of capsule may be dissolved in water immediately before use
Methylphenidate[3]					
Immediate-release					
Methylin®, Ritalin®, generic	Immediate-release tablet	5, 10, 20	---	Decreased appetite, insomnia, headaches, increased HR	• Adjust doses every 1-2 weeks as needed and tolerated
Methylin®	Chewable tablet	2.5, 5, 10	---	Decreased appetite, insomnia, headaches, increased HR	• Adjust doses every 1-2 weeks as needed and tolerated
Methylin®, generic	Oral solution	5 mg/5 mL, 10 mg/5 mL	---	Decreased appetite, insomnia, headaches, increased HR	• Adjust doses every 1-2 weeks as needed and tolerated
Extended-release/Long-acting					
Metadate ER®, Methylin ER®. Ritalin SR®, generic	Extended-release tablet	10, 20	Gradual diffusion of dose over a 6-8 hour time period	Decreased appetite, insomnia, headaches, increased HR	• In general, if switching to long-acting formulation, dose is equivalent to previous total daily dose
Metadate CD®	Extended-release bead-filled capsule	10, 20, 30, 40, 50, 60	30% of dose released immediately; 70% of dose released over a 8-9 hour time period	Decreased appetite, insomnia, headaches, increased HR	• Capsule may be opened and contents sprinkled on soft food and swallowed without chewing[2]
Ritalin LA®	Extended-release bead-filled capsule	10, 20, 30, 40	50% of dose released immediately; 50% is delayed-release and delivered gradually over a prolonged period	Decreased appetite, insomnia, headaches, increased HR	• Capsule may be opened and contents sprinkled on soft food and swallowed without chewing[2]
Concerta®, generic	Extended-release tablet	18, 27, 36, 54	4.5% of dose released within 1 hour, remaining dose gradually released over the subsequent 5-9 hours	Decreased appetite, insomnia, headaches, increased HR	• Inert components of tablet (ghosts) may be seen in stool
Daytrana®[5,6]	Transdermal patch	10 mg/9 hr, 15 mg/9 hr, 20 mg/9 hr, 30 mg/9 hr	Continuous release of dose after application of patch. Average time to effect is 3 hours (range 1-6 hours)	Decreased appetite, insomnia, headaches, increased HR, allergic contact dermatitis	• Apply patch to the hip area in the morning, alternating from one hip to the other each day[5] • Patch cannot be cut • Used patches contain residual drug – keep out of reach of children, dispose of properly

See footnotes at the end of the table.

Medications	Dosage Form	Strengths (mg)	Predominant Adverse Effects	Comments
Atomoxetine (Strattera®)[6†]	Immediate-release capsule	10, 18, 25, 40, 60, 80, 100	Nausea, vomiting, abdominal pain, anorexia, dizziness, somnolence, skin rash, pruritus, increased HR or BP, urinary retention, severe liver injury (rare)	• GI adverse effects may be minimized if given with food • May consider splitting the dose twice daily if adverse effects are bothersome • The full effect may not be appreciated for up to 4 weeks on a given target dose • Capsule should not be opened as atomoxetine is an ocular and mucous membrane irritant • May be discontinued without tapering the dose
Clonidine extended-release (Kapvay®)	Extended-release tablet	0.1	Somnolence, headache, fatigue, insomnia, constipation, dry mouth, decreased BP	• Typically requires twice daily dosing • Safety or efficacy of long-term use for the treatment of ADHD (> 8 weeks) have not been established • Do not abruptly discontinue therapy
Guanfacine extended-release (Intuniv®)	Extended-release tablet	1, 2, 3, 4	Somnolence (up to 38% of patients), headaches, fatigue, upper abdominal pain, nausea, lethargy, dizziness, irritability, decreased BP, decreased appetite	• Do not administer with a high-fat meal (increases absorption) • Metabolism by CYP3A4 gives potential for drug interactions • Not interchangeable with immediate-release guanfacine tablets • Safety and efficacy of long-term use for the treatment of ADHD (> 2 years) have not been established • Do not abruptly discontinue therapy

[1] For patients unable to swallow tablets, it is possible to compound an oral suspension: Justice J, Kupeic TC, Matthews P, et al. Stability of Adderall in extemporaneously compounded oral liquids. *Am J Health-Syst Pharm*. 2001;58:1418-1421.

[2] The prescribing information for Adderall XR®, Focalin XR®, Metadate CD®, and Ritalin LA® state opening the capsule and sprinkling the capsule contents on applesauce resulted in comparable absorption to the intact capsule taken in a fasted state.

[3] 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:

Concerta®: http://www.fda.gov/downloads/Drugs/DrugSafety/ucm088575.pdf
Daytrana® http://www.fda.gov/downloads/Drugs/DrugSafety/ucm088581.pdf
Metadate CD®: http://www.fda.gov/downloads/Drugs/DrugSafety/ucm088635.pdf
Methylin® chewable tablet: http://www.fda.gov/downloads/Drugs/DrugSafety/ucm088639.pdf
Methylin® oral solution: http://www.fda.gov/downloads/Drugs/DrugSafety/ucm088640.pdf
Ritalin®: http://www.fda.gov/downloads/Drugs/DrugSafety/ucm089090.pdf
Ritalin LA®: http://www.fda.gov/downloads/Drugs/DrugSafety/ucm089092.pdf
Ritalin-SR®: http://www.fda.gov/downloads/Drugs/DrugSafety/ucm089826.pdf

[4] Although methylphenidate has been well studied for ADHD, clinical studies of the Daytrana® patch delivery system are limited.

[5] Based on clinical studies, the manufacturer recommends Daytrana® should be removed 9 hours after application. Drug absorption may continue for 2-3 hours after removal of the patch.

[6] 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.

†This medication should be discontinued in patients who develop jaundice or laboratory evidence of liver injury.

*** This information is current as of January 2012. See prescribing information for complete details. For the most up-to-date medication information, consider the following sources: www.epocrates.com, www.micromedex.com, www.uptodate.com, www.pdr.net.**

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

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

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

Fewer studies are available documenting the benefit and safety of alternate agents 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.

Table 3: Summary of Non-FDA Approved Alternative Medications That May Be Considered for Children and Adolescents

Medications	Dosage Form	Strengths (mg)	Predominant Adverse Effects	Comments
Bupropion (Wellbutrin®)	Immediate-release tablet	75, 100	Sedation, constipation, dry 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.
Bupropion (Wellbutrin SR®)	Sustained-release tablet	100, 150, 200		
Bupropion (Wellbutrin XL®)	Extended-release tablet	150, 300		
Clonidine (Catapres®)	Immediate-release tablet	0.1, 0.2, 0.3	Sedation, rashes (transdermal patch), orthostatic hypotension (< 5% of patients)	• 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
Clonidine (Catapres®)	Transdermal patch	0.1 mg/24 h 0.2 mg/24 h 0.3 mg/24 h		
Guanfacine (Tenex®)	Immediate-release tablet	1, 2	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
Desipramine (Norpramin®)[1,2]	Immediate-release tablet	10, 25, 50, 75, 100, 150	Cardiac conduction disturbances, dry mouth, urinary retention, headache	
Imipramine (Tofranil®)	Immediate-release tablet	10, 25, 50	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 monitoring during therapy[2] • All children and adolescents treated with antidepressants for any indication require close monitoring for suicidality or unusual changes in behavior

[1] EKG Monitoring Guidelines (imipramine, desipramine):
- HR < 130 at rest
- QRS < 30% over baseline
- PR < 210 msec
- QTc < 450 msec
- BP < 130/85

[2] 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 2012. See prescribing information for complete details. For the most up-to-date medication information, consider the following sources: www.epocrates.com, www.micromedex.com, www.uptodate.com, www.pdr.net.

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

18. Multimodal Management Coordinated by Primary Clinician

Recommendation:

- In addition to primary medication treatment, multimodal intervention is commonly needed for management of ADHD and other concomitant conditions and comorbidities.

As with many conditions, ADHD is rarely a singular diagnosis. In addition to medication, multimodal intervention is commonly needed for the management of ADHD and 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 [High Quality Evidence])*. Results indicated that for the core symptoms of ADHD, intensive medication management was superior to results of the behavioral treatment only and to the routine community care groups studied. Combined treatment of medication management and intensive behavioral treatment did not yield significantly greater benefits than medication management alone *(Arnold, 2004 [High Quality Evidence]; MTA Cooperative Group, 2004a [High Quality Evidence]; MTA Cooperative Group, 2004b [High Quality Evidence])*. 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 [High Quality Evidence])*.

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 [Low Quality Evidence])*. Use of medication may improve the response to other therapies (psychoeducation, behavior therapy) in the school setting *(Döpfner, 2004 [High Quality Evidence])*.

A meta-analysis of studies conducted between 1978-2008 found that behavior treatments (parent, teacher, and child based) were effective for ADHD *(Fabiano, 2009 [Meta-analysis])*.

In young children (ages 7-9), no benefit was found for clinic-based social skills training over stimulant use *(Abikoff, 2004a [Moderate Quality Evidence])*. 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 [Moderate Quality Evidence])*. Children without learning or conduct disorders who responded to stimulants did not further benefit from therapy or academic assistance *(Hechtman, 2004 [High Quality Evidence])*.

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19. Parents/Family-Focused Strategies

Recommendations:

- Recognize that parents have a unique role in ADHD management for their children.
- Support parents learning management skills through ADHD support groups, advocacy groups and parenting skills training.
- Offer specific intervention strategies to parents, as they find them 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 setting but in the home, in sports and socially. They have a long-term goal of seeing their children become

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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 *(Shelton, 1992 [Low Quality Evidence]; Horn, 1987 [High Quality Evidence])*.

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 Implementation Tools and 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, increasing self-esteem, enhancing positive aspects of the parent-child relationship, and reducing 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 [Meta-analysis])* 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 involvements (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 him/her know he or she is 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).

Complementary Alternative Medicine (CAM)

Medications for ADHD, especially stimulant medications, remain the best documented and most beneficial treatment for core ADHD symptoms. While these medications are generally well tolerated, a substantial minority of patients continue to exhibit a range of adverse effects. A minority of patients are non-responders to medication.

Given concerns regarding side effects and potential long-term adverse effects of medication, parents often seek alternative treatment modalities that are safe and potentially useful. Examples of common complementary alternative medicine (CAM) therapies investigated for ADHD are herbal remedies, nutritional supplements, biofeedback, massage, acupuncture, meditation and dietary changes.

Most CAM modalities have not been subjected to systematic precise studies to determine efficacy in treating ADHD symptoms. A few CAM treatments (meditation, acupuncture) have been investigated and have not shown documented effectiveness *(Li, 2011 [Systematic Review]; Krisanaprakornkit, 2010 [Systematic Review])*. Studies of other CAM modalities (iron supplements, elimination diets) indicate positive benefits

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(Pelsser, 2011 [High Quality Evidence]; Calarge, 2010 [High Quality Evidence]; Konofal, 2008 [High Quality Evidence]). However, due to small sample size or limited number of studies, they fail to qualify as evidence-based criteria influencing ICSI guideline recommendations. These are areas to monitor the literature for future research.

Neurofeedback has been demonstrated in one randomized, controlled clinical trial *(Gevensleben, 2009 [High Quality Evidence])* to be significantly better than a computerized attention skills training control. ADHD symptoms were moderately improved. Long-term benefits have not been definitively proven. The cost and time involved in treatment need to be taken into account. Neurofeedback for ADHD lacks sufficient research support. Treatment response rates have not reached the level shown with psychostimulant medications; therefore neurofeedback cannot be recommended as an alternative to medication use in ADHD.

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.

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20. Child Interventions

Recommendations:

- 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 often helpful to address common educational and executive function deficits.

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 *(Shapiro, 1994 [Low Quality Evidence]; Minnesota Department of Education, 1993 [Reference])*. 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.

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Social skills training (group or individual) instructs children in the execution of specific prosocial behaviors *(Pelham Jr, 1998 [Low Quality Evidence]; Guevremont, 1993 [Low Quality Evidence]; Kazdin, 1989 [High Quality Evidence])*. 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 [Low Quality Evidence])*. 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 *(Pelham, 1992 [Low Quality Evidence]; Fehlings, 1991 [High Quality Evidence]; Hinshaw, 1984 [High Quality Evidence])*.

Study/Organizational Skills Training

Study and organizational skills building should be offered in conjunction with curriculum intervention *(Minnesota Department of Education, 1993 [Reference])*. 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.

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21. School Interventions

Recommendations:

- Primary care providers for children with ADHD should advocate and assist parents in appropriate school programming, services and supports.
- If medication is not tolerated or effective for the patient, or not desired by the parents after shared decision-making with the primary physician, family-focused strategies as well as child and school interventions should be emphasized.

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

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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 *(DuPaul, 1994 [Reference]; Pelham Jr, 1993 [Moderate Quality Evidence]; Carlson, 1992 [High Quality Evidence]; Fowler, 1992 [Reference]; Pelham, 1992 [Low Quality Evidence]; Bloomquist, 1991 [High Quality Evidence]; Whalen, 1991 [Low Quality Evidence]; Hinshaw, 1984 [Low Quality Evidence])*. 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 are 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.

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22. Maintenance and Continuing Care

Recommendations:

- Direct all management goals at building success for the child in his/ her daily life skills and for their future.
- During evaluation and management visits, take into consideration medical, psychosocial and educational factors.
- Give anticipatory guidance at each visit; this can include immediate and long-term expectations, study and organizational skills, guidance on behavior management, adolescent concerns and updating resources.
- Consider advocacy issues and revise multimodal care management as needed.
- Recognize in the transition to adulthood 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.

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 are 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.

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- 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 *(American Academy of Child and Adolescent Psychiatry, 2007 [Guideline])* and the American Academy of Pediatrics *(American Academy of Pediatrics, 2001 [Guideline])*. 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 [Guideline]; National Institutes of Health Consensus Statement, 1998 [Guideline])*.

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.

Psychosocial

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

Educational

- ADHD symptoms
- Child-teacher relationships, social functioning, general attitude

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- 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 [High Quality Evidence]; Barkley, 2007 [Low Quality Evidence])*. 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 [Low Quality Evidence])* differentiates between mild, moderate and severe ADHD, and indicates a threefold increase in injury-related accidents in the severe category versus 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 [Low Quality Evidence])*. 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 potentially improved driving performance with long-acting methylphenidate *(Barkley, 2007 [Low Quality Evidence])*. Other newer agents have not been tested. It is advised that the physician inquire about driving abilities on and off medications.
  - Nicotine: Adolescents with a lifetime diagnosis of ADHD displayed significantly 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 [Low Quality Evidence])*.
  - 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 [Low Quality Evidence])*. 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 [Low Quality Evidence])*.

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- 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 *(Rodriguez, 2008 [Low Quality Evidence]; Elkins, 2007 [Low Quality Evidence])*. There is no association between the inattentive type of ADHD and substance use *(Elkins, 2007 [Low Quality Evidence])*.

- 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 [Systematic Review])*. Another study showed 8% intranasal use by college students during the previous six months *(Rabiner, 2009 [Low Quality Evidence])*.

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 [Low Quality Evidence])*.
- 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 [Low Quality Evidence])*.
- Identify post-secondary education or vocational plans, and counsel patient regarding availability of academic support services.
- Identify adult health care provider to transfer care to 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 cormorbidities are common.
- Address risk of medication abuse by patient and peers.

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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 are 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.

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

ADVERSE EFFECT	MANAGEMENT
Anorexia, weight loss, stomachache	• Administer dose with/after meals • High-caloric breakfast and snacks after school/bedtime • Limit stimulant to high-priority needs • Consider dietitian referral for nutrition evaluation/counseling
Insomnia	• Low-stress "wind-down time" after school • Administer dose earlier in day • Discontinue afternoon/evening dose • Change to short-acting preparation • Consider alternative or adjunctive medications (e.g., atomoxetine, clonidine, antidepressants)
Rebound irritability/moodiness (usually occurs as the medication is wearing off)	• Overlap stimulant dosing • Step down dosing • Try long-acting or combination short-/long-acting preparations
Generalized irritability, dysphoria, agitation	• Assess timing of symptoms (e.g., peak withdrawal) • Consider comorbid condition • Reduce dose or change to long-acting preparation • Consider alternative/adjunctive medication (e.g., another stimulant, antidepressant)
Tics (simple vocal, motor)	• Monitor if mild, infrequent • Weigh benefit/risk and discuss with parents • Consider alternative medication (e.g., atomoxetine, clonidine, guanfacine) • See Annotation #22, "Maintenance and Continuing Care," for further information
Headache	• Assess timing • Reduce dose with gradual return to therapeutic dose • Try long-acting preparation • Consider alternative medication
Linear growth impairment	• Limit stimulant to high-priority needs (e.g., try weekend/vacation drug "holidays") • If significant, consider alternative medication • See Annotation #22, "Maintenance and Continuing Care," for further information

(Ahmann, 2001 [High Quality Evidence]; Wilens, 1992 [Low Quality Evidence])

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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 adherence 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 [High Quality Evidence])*. 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 [High Quality Evidence])*. Though stimulants have not been proven to worsen tics, they may exacerbate tics in some cases. Alpha agonists or atomoxetine may serve as alternatives *(Pringsheim, 2011 [Systematic Review])*.

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 *(Poulton, 2005 [Low Quality Evidence]; MTA Cooperative Group, 2004b [High Quality Evidence])*.

ADHD is a lifelong chronic condition. While it is common for the hyperactivity part of the condition to ameliorate throughout adolescence, there often remain (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, as well as to rely on their significant strengths to overcome any persisting ADHD symptoms.

(Wolraich, 1996 [Reference]; DuPaul, 1991 [Low Quality Evidence]; Lambert, 1987 [Low Quality Evidence])

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The Aims and Measures section is intended to provide guideline users with a menu of measures for multiple purposes which may include the following:

- Population health improvement measures
- Quality improvement measures for delivery systems
- Measures from regulatory organizations such as Joint Commission
- Measures that are currently required for public reporting
- Measures that are part of Center for Medicare Services Physician Quality Reporting initiative
- Other measures from local and national organizations aimed at measuring population health and improvement of care delivery.

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

The subdivisions of this section are:

- Aims and Measures
- Implementation Recommendations
- Implementation Tools and Resources

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Aims and Measures

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

   Measure for 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)*

   Measure for 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)*

   Measure for 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 follow-up visits at least twice a year that include height, weight, a discussion of medication, a discussion of school progress and a care plan.

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

   Measure for accomplishing this aim:

   a. Percentage of patients diagnosed with ADHD whose medical record contains documentation of discussion of 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.

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Measurement Specifications

Measurement #1a

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

Population Definition

Patients ages 5 through 18 years diagnosed with ADHD ICD-9 codes 314.00 and 314.01.

Data of Interest

$$\frac{\text{\# of patients with documentation of DSM-IV-TR or DSM-PC criteria used to diagnose ADHD}}{\text{\# of newly diagnosed ADHD patients}}$$

Numerator/Denominator Definitions

Numerator: Number of patients newly diagnosed with ADHD whose medical record contains documentation that DSM-IV-TR or DSM-PC criteria were used to diagnose ADHD.

Newly diagnosed is defined as ICD-9 codes 314.00 or 314.01 and includes patients diagnosed in the past six months from the measurement date.

The list of DSM criteria for use in diagnosis of ADHD listed in the ICSI ADHD guideline.

Documentation is defined as any evidence in the medical record that DSM-IV-TR or DSM-PC criteria were addressed.

Note for measurement: For DSM criteria B; use outpatient visit date as the age baseline and parent reports for criteria involving history of symptoms.

Denominator: Number of patients newly diagnosed with ADHD.

Newly diagnosed is defined as ICD-9 codes 314.00 or 314.01 and includes patients diagnosed in the past six months from the measurement date.

Method/Source of Data Collection

Query EMR for all patients diagnosed with ADHD in the past six months from the measurement date. Determine from medical records for each patient whether DSM-IV or DSM-PC criteria were used to diagnose ADHD.

Time Frame Pertaining to Data Collection

Monthly.

Notes

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

This is a process improvement measure, and improvement is noted as an increase in the rate.

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Measurement #2a

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).

Population Definition

Patients age 5 through 18 years diagnosed with ADHD ICD-9 codes 314.00 and 314.01.

Data of Interest

$$\frac{\text{\# of patients with documentation of screening for other primary conditions and comorbidities}}{\text{\# of newly diagnosed ADHD patients}}$$

Numerator/Denominator Definitions

Numerator: Number of patients newly diagnosed with ADHD whose medical record contains documentation that patients were screened for other primary conditions and comorbidities.

Newly diagnosed is defined as ICD-9 codes 314.00 or 314.01 and includes patients diagnosed in the past six months from the measurement date.

Denominator: Number of patients newly diagnosed with ADHD.

Newly diagnosed is defined as ICD-9 codes 314.00 or 314.01 and includes patients diagnosed in the past six months from the measurement date.

Method/Source of Data Collection

Query EMR for all patients diagnosed with ADHD in the past six months from the measurement date. Determine from medical records for each patient whether patients were screened for other primary conditions and comorbidities.

Time Frame Pertaining to Data Collection

Monthly.

Notes

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

This is a process improvement measure, and improvement is noted as an increase in the rate.

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Measurement #3a

Percentage of patients diagnosed with ADHD who have cardiovascular history assessed before psychostimulant medication is prescribed.

Population Definition

Patients age 5 through 18 years diagnosed with ADHD ICD-9 codes 314.00 and 314.01.

Data of Interest

$$\frac{\text{\# of patients with documentation of cardiovascular history assessment before psychostimulant medication was prescribed}}{\text{\# of ADHD patients prescribed psychostimulant medication}}$$

Numerator/Denominator Definitions

Numerator: Number of patients diagnosed with ADHD and prescribed psychostimulant medication whose medical record contains documentation that cardiovascular history was assessed before psychostimulant medication was prescribed.

Denominator: Number of patients diagnosed with ADHD and prescribed psychostimulant medication.

Diagnosed is defined as ICD-9 codes 314.00 or 314.01 and includes patients diagnosed with ADHD and prescribed psychostimulant medication in the past 12 months from the measurement date. Denominator should include only those patients who have had both the diagnosis and psychostimulant prescribed in the past 12 months from the measurement date.

Method/Source of Data Collection

Query EMR for all patients diagnosed with ADHD in the past 12 months from the measurement date and prescribed psychostimulant medication in the past 12 months from the measurement date. Determine from medical records for each patient whether patients had cardiovascular history assessed before psychostimulant medication was prescribed.

Time Frame Pertaining to Data Collection

Monthly.

Notes

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

This is a process improvement measure, and improvement is noted as an increase in the rate.

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Measurement #3b

Percentage of patients treated with psychostimulant with medication for the diagnosis of ADHD whose medical record contains documentation of a follow-up visit at least twice a year and had the following discussed at each of the visits: height, weight, medication, school progress and a care plan.

Population Definition

Patients age 5 through 18 years diagnosed with ADHD ICD-9 codes 314.00 and 314.01 and prescribed psychostimulant medication.

Data of Interest

$$\frac{\text{\# of medical records of ADHD patients on psychostimulant medication with documentation of at least two follow-up visits a year and follow-up components discussed: height, weight, medication, school progress and a care plan}}{\text{Total \# of ADHD patients on psychostimulant medication whose medical records are reviewed}}$$

Numerator/Denominator Definitions

Numerator: Number of patients diagnosed with ADHD and prescribed psychostimulant medication whose medical record contains documentation of at least two follow-up visits within a year medication was prescribed and the following components were discussed at each of the visits: height, weight, medication, school progress, and a care plan.

Denominator: Number of patients diagnosed with ADHD and prescribed psychostimulant medication.

Diagnosed patients is defined as ICD-9 codes 314.00 or 314.01.

For this measure, count medication prescription date as the start of a 12-month period.

Method/Source of Data Collection

Query EMR for all patients diagnosed with ADHD and prescribed psychostimulant medication. Determine from medical records for each patient whether patients had at least two follow up visits within 12 months of medication prescription and whether following components were addressed during each visit: height, weight, medication, school progress, and a care plan.

Time Frame Pertaining to Data Collection

Monthly.

Notes

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

This is a process improvement measure, and improvement is noted as an increase in the rate.

NCQA HEDIS Measure on Medication Follow up for Children with ADHD: The percentage of children newly prescribed attention-deficit/hyperactivity disorder (ADHD) medication who have at least three follow-up care visits within a 10-month period, one of which is within 30 days of when the first ADHD medication was dispensed. Full specifications for HEDIS measure are available at http://www.ncqa.org.

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Measurement #4a

Percentage of patients diagnosed with ADHD whose medical record contains documentation of discussion of parental resources for managing children with ADHD (e.g., parent training groups, videos, books, psychology referral).

Population Definition

Patients age 5 through 18 years diagnosed with ADHD ICD-9 codes 314.00 and 314.01.

Data of Interest

$$\frac{\text{\# of patients with documentation of parental resources discussion}}{\text{\# of diagnosed ADHD patients}}$$

Numerator/Denominator Definitions

Numerator: Number of patients diagnosed with ADHD whose medical record contains documentation that parental resources for managing ADHD were discussed.

Parental resources may include parent training groups, videos, books, psychology referral.

Denominator: Number of patients diagnosed with ADHD.

Diagnosed is defined as ICD-9 codes 314.00 or 314.01 and includes patients diagnosed in the past 12 months from the measurement date.

Method/Source of Data Collection

Query EMR for all patients diagnosed with ADHD in the past 12 months from the measurement date. Determine from medical records for each patient whether clinician discussed the need for school-based suports and eduational service options for children with ADHD.

Time Frame Pertaining to Data Collection

Monthly.

Notes

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

This is a process improvement measure, and improvement is noted as an increase in the rate.

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Measurement #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

Patients ages 5 through 18 years diagnosed with ADHD ICD-9 codes 314.00 and 314.01.

Data of Interest

$$\frac{\text{\# of patients with documentation of school-based supports discussion}}{\text{Total \# of diagnosed ADHD patients}}$$

Numerator/Denominator Definitions

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

Denominator: Number of patients diagnosed with ADHD.

Diagnosed is defined as ICD-9 codes 314.00 or 314.01 and includes patients diagnosed in the past 12 months from the measurement date.

Method/Source of Data Collection

Query EMR for all patients diagnosed with ADHD in the past 12 months from the measurement date. Determine from medical records for each patient whether clinician discussed the need for school-based supports and educational service options for children with ADHD.

Time Frame Pertaining to Data Collection

Monthly.

Notes

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

This is a process improvement measure, and improvement is noted as an increase in the rate.

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Implementation Recommendations

Prior to implementation, it is important to consider current organizational infrastructure that address the following:

- System and process design;
- Training and education; and
- Culture and the need to shift values, beliefs and behaviors of the organization.

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:

- Evaluation for key features of ADHD using the DSM-IV-TR/DSM-PC criteria must include information from multiple sources such as parents/caregivers, the child and school personnel, and must be documented in the patient medical record.
- Results of the evaluation are critical to identify appropriate treatment options and resources.
- Develop processes that allow for consistent documentation and monitoring of diagnosis and management of ADHD.
- Develop a process for follow-up assessment and success in management of ADHD for primary care provider, parents and school.
- Develop a process for consistent documentation and monitoring of medication.
- 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.

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Implementation Tools and Resources

Criteria for Selecting Resources

The following tools and resources specific to the topic of the guideline were selected by the work group. Each item was reviewed thoroughly by at least one work group member. It is expected that users of these tools will establish the proper copyright prior to their use. The types of criteria the work group used are:

- The content supports the clinical and the implementation recommendations.
- Where possible, the content is supported by evidence-based research.
- The author, source and revision dates for the content is included where possible.
- The content is clear about potential biases and when appropriate conflicts of interests and/or disclaimers are noted where appropriate.

Resources Available to ICSI Members Only

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

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Implementation Tools and Resources Table

*	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	http://www.addwarehouse.com or call 1-800-233-9273
	ADDitude Magazine	Online resource for information on techniques for dealing with common area of Attention Deficit Disorder.	Patients and Families; Health Care Professionals	http://www.additudemag.com/
	ADDvance	Online resources for answering questions regarding ADHD.	Patients and Families; Health Care Professionals	http://www.addvance.com
	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	http://www.kids4health.net/ Phone: 763-544-6806
	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	http://www.aacap.org
	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. Includes ADHD "basics" for families and patients.	Patients and Families; Health Care Professionals	http://www.aap.org/healthtopics/adhd.cfm
	Attention Deficit Disorder Association	Provides information, resources and networking opportunities for adults with Attention Deficit Hyperactivity Disorder.	Adult Patients and Families	http://www.add.org

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Implementation Tools and Resources Table

*	Author/Organization	Title/Description	Audience	Web Sites/Order Information
	Children and Adults with Attention Deficit Disorders (CHADD)	Non-profit organization providing education, advocacy and support to individuals with ADHD and their families, teachers, professionals and others. CHADD is a member organization produces the bimonthly Attention magazine (for members) and sponsors an annual conference. The National Resources Center on ADHD (NRC) is a CDC-funded national clearinghouse for evidence-based information about ADHD.	Patients and Families; Health Care Professionals	National Resource Center on ADHD: http://www.chadd.org
	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	http://www.cec.sped.org Phone: 1-888-232-7733
*	Colleen Dobie, Allina Medical Clinic	Screening for ADHD Medications	Health Care Professionals	http://www.icsi.org/improvement_resources/knowledge_resources/tools/
	DrThomasBrown.com	A Web site that offers a new understanding of Attention Deficit Disorder.	Health Care Professionals	http://www.drthomasebrown.com/brown_model/index.html
	K12 Academics	National education resource Web site with a community based approach. The site serves as a tool for teachers, students, district officials and parents involved in the K-12 education system. This Web site is based out of the U.S. Library of Congress.	Teachers; Administrators; Patients and Families; Health Care Professionals	http://www.k12academics.com/addadhd.htm
	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	http://www.ncqaqiconnection.org

* Available to ICSI members only.

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*	Author/Organization	Title/Description	Audience	Web Sites/Order Information
	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	http://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml
	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	http://www.pacer.org
	SchoolBehavior.com	Online resource offers practical knowledge and tools that can be used to help educators learn about a number of neurological disorders that may impair a students functioning and that can occasionally cause disruption in a classroom setting.	Patients and Families; Health Care Professionals	http://www.schoolbehavior.com/disorders/attention-deficit-hyperactivity-disorder
	Tourette Syndrome "Plus"	Information on Tourette syndrome plus the associated disorders.	Health Care Professionals	http://www.tourettesyndrome.net/disorders/executive-dysfunction/

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Appendix A – Screening Tool for Sudden Death Cardiac Risk Factors among Children Starting Stimulant Medication

APPENDIX 2

Screening tool for the identification of potential cardiac risk factors for sudden death among children starting stimulant medication

Answering "yes" to any of these items should prompt further investigation or review by a specialist in pediatric cardiology

History	**Yes**	**No**
Shortness of breath with exercise (more than other children of the same age) in the absence of an alternative explanation (eg, asthma, sedentary lifestyle, obesity)		
Poor exercise tolerance (in comparison with other children) in the absence of an alternative explanation (eg, asthma, sedentary lifestyle, obesity)		
Fainting or seizures with exercise, startle or fright		
Palpitations brought on by exercise		
Family history of sudden or unexplained death including sudden infant death syndrome, unexplained drowning or unexplained motor vehicle accidents (in first- or second-degree relatives)		
Personal or family history (in first- or second-degree relatives) of nonischemic heart disease	**Yes**	**No**
Long QT syndrome or other familial arrhythmias		
Wolff-Parkinson-White syndrome		
Cardiomyopathy		
Heart transplant		
Pulmonary hypertension		
Unexplained motor vehicle collisions or drowning		
Implantable defibrillator		
Physical examination	**Yes**	**No**
Hypertension		
Organic (not functional) murmur present		
Sternotomy incision		
Other abnormal cardiac findings		

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ICSI has long had a policy of transparency in declaring potential conflicting and competing interests of all individuals who participate in the development, revision and approval of ICSI guidelines and protocols.

In 2010, the ICSI Conflict of Interest Review Committee was established by the Board of Directors to review all disclosures and make recommendations to the board when steps should be taken to mitigate potential conflicts of interest, including recommendations regarding removal of work group members. This committee has adopted the Institute of Medicine Conflict of Interest standards as outlined in the report, Clinical Practice Guidelines We Can Trust (2011).

Where there are work group members with identified potential conflicts, these are disclosed and discussed at the initial work group meeting. These members are expected to recuse themselves from related discussions or authorship of related recommendations, as directed by the Conflict of Interest committee or requested by the work group.

The complete ICSI Policy regarding Conflicts of Interest is available at http://bit.ly/ICSICOI.

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ICSI facilitates and coordinates the guideline development and revision process. ICSI, member medical groups and sponsoring health plans review and provide feedback but do not have editorial control over the work group. All recommendations are based on the work group's independent evaluation of the evidence.

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All ICSI documents are available for review during the revision process by member medical groups and sponsors. In addition, all members commit to reviewing specific documents each year. This comprehensive review provides information to the work group for such issues as content update, improving clarity of recommendations, implementation suggestions and more. The specific reviewer comments and the work group responses are available to ICSI members at http://www.icsi.org.

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ICSI Document Development and Revision Process

Overview

Since 1993, the Institute for Clinical Systems Improvement (ICSI) has developed more than 60 evidence-based health care documents that support best practices for the prevention, diagnosis, treatment or management of a given symptom, disease or condition for patients.

Audience and Intended Use

The information contained in this ICSI Health Care Guideline is intended primarily for health professionals and other expert audiences.

This ICSI Health Care Guideline should not be construed as medical advice or medical opinion related to any specific facts or circumstances. Patients and families are urged to consult a health care professional regarding their own situation and any specific medical questions they may have. In addition, they should seek assistance from a health care professional in interpreting this ICSI Health Care Guideline and applying it in their individual case.

This ICSI Health Care Guideline is designed to assist clinicians by providing an analytical framework for the evaluation and treatment of patients, and is not intended either to replace a clinician's judgment or to establish a protocol for all patients with a particular condition.

Document Development and Revision Process

The development process is based on a number of long-proven approaches and is continually being revised based on changing community standards. The ICSI staff, in consultation with the work group and a medical librarian, conduct a literature search to identify systematic reviews, randomized clinical trials, meta-analysis, other guidelines, regulatory statements and other pertinent literature. This literature is evaluated based on the GRADE methodology by work group members. When needed, an outside methodologist is consulted.

The work group uses this information to develop or revise clinical flows and algorithms, write recommendations, and identify gaps in the literature. The work group gives consideration to the importance of many issues as they develop the guideline. These considerations include the systems of care in our community and how resources vary, the balance between benefits and harms of interventions, patient and community values, the autonomy of clinicians and patients and more. All decisions made by the work group are done using a consensus process.

ICSI's medical group members and sponsors review each guideline as part of the revision process. They provide comment on the scientific content, recommendations, implementation strategies and barriers to implementation. This feedback is used by and responded to by the work group as part of their revision work. Final review and approval of the guideline is done by ICSI's Committee on Evidence-Based Practice. This committee is made up of practicing clinicians and nurses, drawn from ICSI member medical groups.

Implementation Recommendations and Measures

These are provided to assist medical groups and others to implement the recommendations in the guidelines. Where possible, implementation strategies are included that have been formally evaluated and tested. Measures are included that may be used for quality improvement as well as for outcome reporting. When available, regulatory or publicly reported measures are included.

Document Revision Cycle

Scientific documents are revised every 12-24 months as indicated by changes in clinical practice and literature. Each ICSI staff monitors major peer-reviewed journals every month for the guidelines for which they are responsible. Work group members are also asked to provide any pertinent literature through check-ins with the work group midcycle and annually to determine if there have been changes in the evidence significant enough to warrant document revision earlier than scheduled. This process complements the exhaustive literature search that is done on the subject prior to development of the first version of a guideline.

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