



INSTITUTE FOR CLINICAL  
SYSTEMS IMPROVEMENT

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# Health Care Guideline

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- health plans, health systems, health care organizations, hospitals and integrated health care delivery systems;
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- researchers;
- federal, state and local government health care policy makers and specialists; and
- employee benefit managers.

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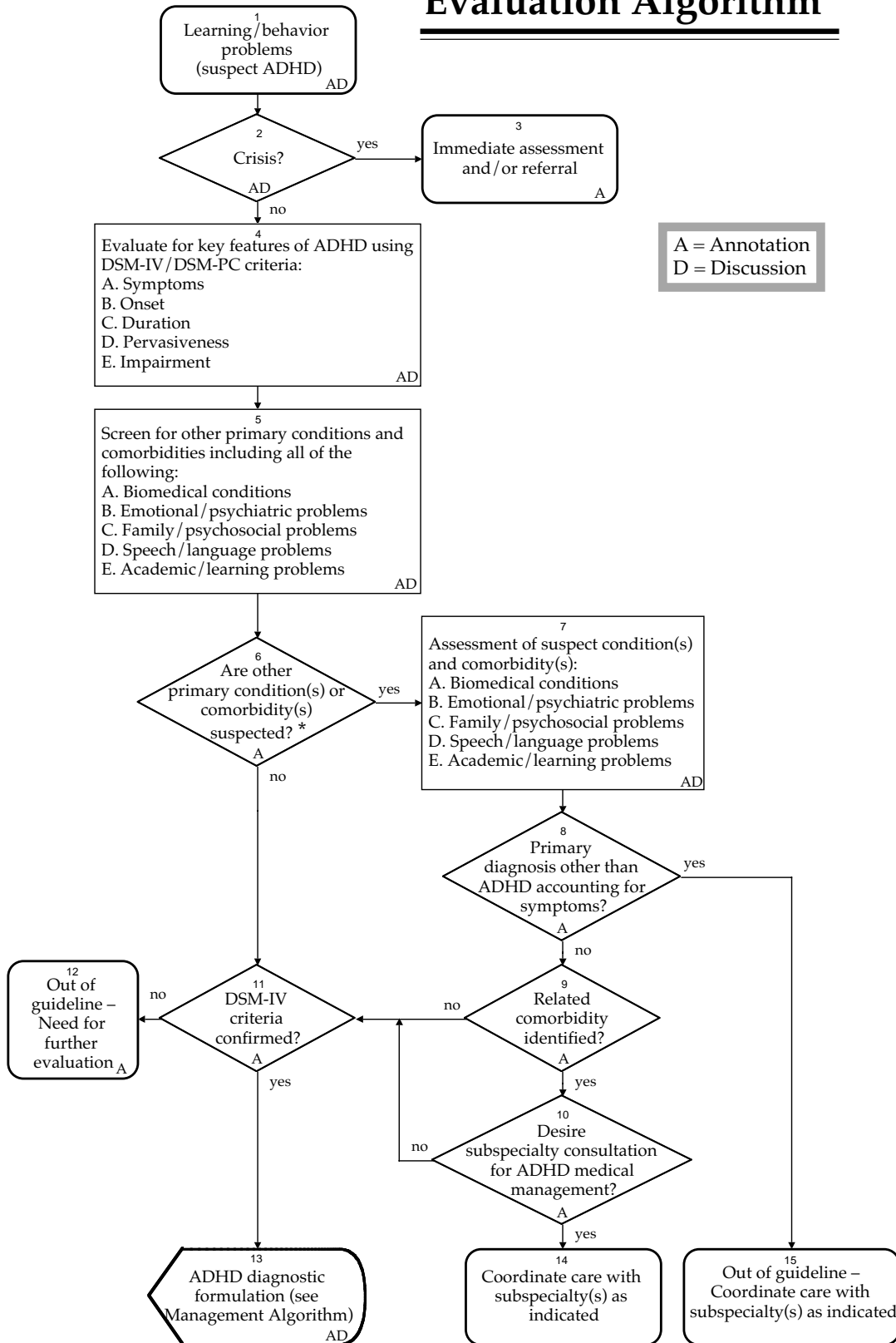
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Health Care Guideline  
**Diagnosis and Management of Attention Deficit  
 Hyperactivity Disorder in Primary Care**

**Evaluation Algorithm**



A = Annotation  
 D = Discussion

**General Implementation  
 January 2000**

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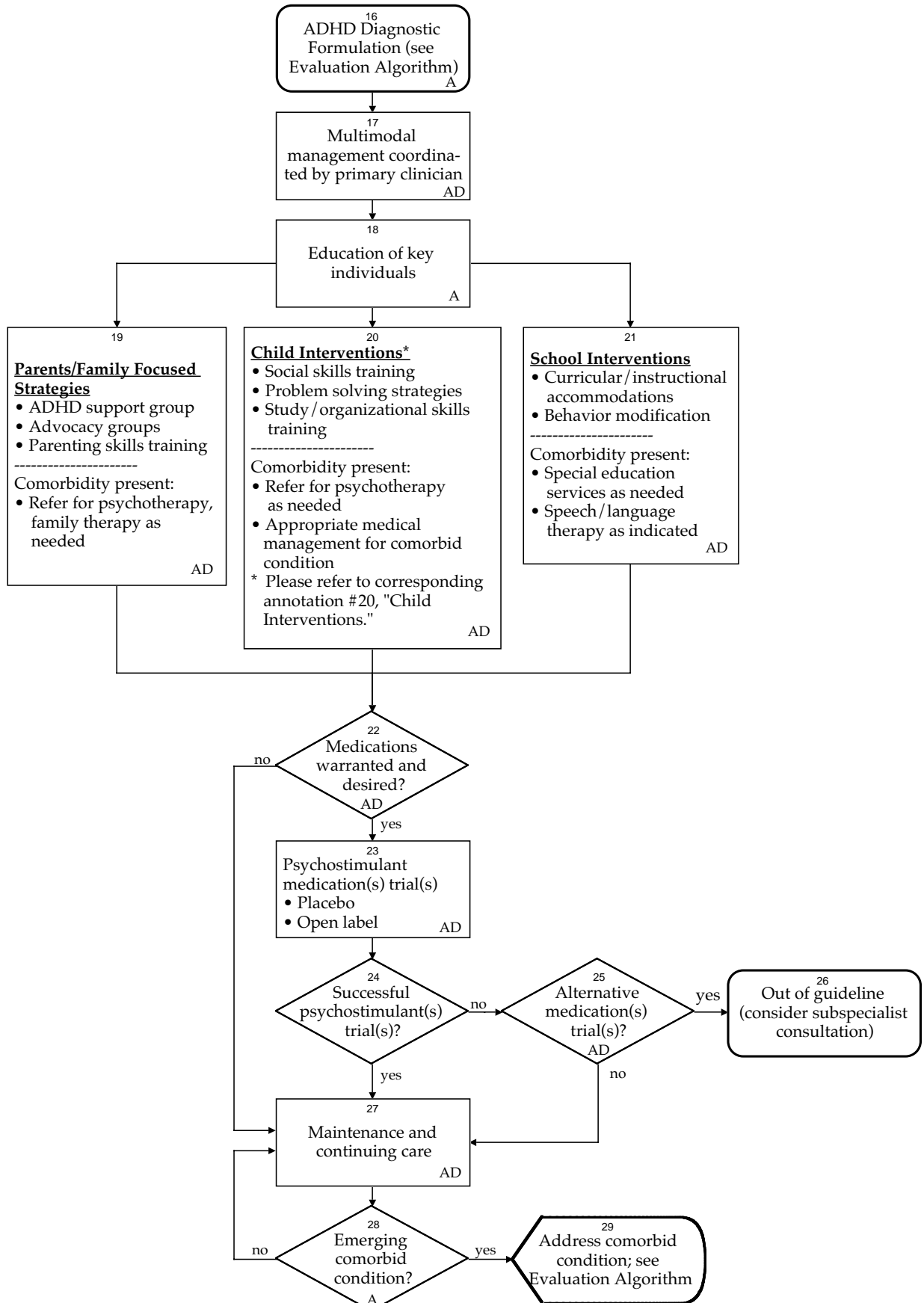
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These clinical guidelines are designed to assist clinicians by providing an analytical framework for the evaluation and treatment of patients, and are not intended either to replace a clinician's judgment or to establish a protocol for all patients with a particular condition. A guideline will rarely establish the only approach to a problem.



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 and discussion sections 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 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.

## **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.

## **RELATED GUIDELINES**

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

## **PRIORITY AIMS FOR MEDICAL GROUPS WHEN USING THIS GUIDELINE**

1. Increase the use of DSM-IV or DSM-PC criteria and screening for other primary conditions and comorbidities for patients newly diagnosed with attention deficit hyperactivity disorder.

Possible measures of accomplishing this aim:

- a. Percentage of patients newly diagnosed with ADHD whose medical record contains documentation of DSM-IV or DSM-PC criteria.
- b. Percentage of patients newly diagnosed with ADHD whose medical record contains documentation of screening for other primary conditions and co-morbidities, as defined in the guideline.

2. Improve the primary care use of psychostimulant medications through a systematic, uniform approach.

Possible measures of accomplishing this aim:

- a. Percentage of patients diagnosed with ADHD whose medical record contains documentation that the clinician performed an open label or placebo controlled stimulant medication trial.
  - b. Percentage of patients diagnosed with ADHD and on psychostimulant medication whose medical record contains documentation of a follow-up visit at least twice a year.
3. Increase the number of clinicians who are utilizing a multimodality approach in treatment planning for children with ADHD.

Possible measures of accomplishing this aim:

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

### **EVIDENCE GRADING SYSTEM**

Individual research reports are assigned a letter indicating the class of report based on design type: A, B, C, D, M, R, X. A full explanation of these designators is found in the Discussion and References section of this guideline.

In future versions of this guideline, selected conclusions will include a statement of the grade assigned to the conclusion.

## **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 spoken to 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 7 years
- C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home)
- D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.
- E. The symptoms do not occur exclusively during the course of a pervasive developmental disorder, schizophrenia or other psychotic disorder, and are not better accounted for by another mental disorder (e.g., mood disorder, anxiety disorder, dissociative disorder, or personality disorder).

## DSM-IV/DSM-PC Criteria for ADHD (cont) *Diagnosis and Management of ADHD*

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### Code based on type:

- 314.00 Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type: if criterion A(1) is met but criterion A(2) is not met for the last 6 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 6 months.
- 314.01 Attention-Deficit/Hyperactivity Disorder, Combined Type: If both criterion A(1) and criterion A(2) are met for the last 6 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.

## EVALUATION ALGORITHM ANNOTATIONS

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

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
- \* Absent mindedness
- \* 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
- \* 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

Evidence supporting these conclusions is of classes: B, C, R

## 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 which precludes the initiation of the guideline.

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?

### B. Life Disruptive

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

## 3. Immediate Assessment And/Or Referral

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

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

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, 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 (Barkley, BASC, etc.) with behavior rating scales (ADHD-IV Rating Scale, Child Attention Profile, Conners, etc.) completed by the parents, other care givers and school personnel.

The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)*, is recognized as the most widely used resource for diagnosis of mental disorders, including ADHD. 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 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.

Other components of the evaluation will be described at subsequent points within the guideline. (See the Discussion section.)

## A. Symptoms

ADHD is categorized by the following core symptoms:

- inattention
- hyperactivity
- impulsivity

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

There are 3 subtypes of the disorder based upon the "often" occurrence of at least 6 of 9 behaviors within the inattention dimension, and 6 of 9 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).

## B. Onset

Some behavioral symptoms typically have begun prior to the age of 7 years in most children (see DSM-IV/DSM-PC criteria). These symptoms may not be obvious in children who are predominantly inattentive without significant hyperactivity or impulsivity. Careful previous history must be reviewed, especially in older children and adolescents, for the presence of symptoms not previously recognized or identified.

## C. Duration

The presence of behavioral symptoms is typically of long duration (at least 6 months - see DSM-IV/DSM-PC criteria) if 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 care givers. 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, etc.).

## D. 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/DSM-PC criteria).

## E. Impairment

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

A word about behavior rating scales:

At least one standardized rating scale (see the Discussion and References section) is recommended for reviewing observations from those persons in direct contact with the child/adolescent (parents, day care provider, 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). **The ADHD-IV Rating Scale is normed based on DSM-IV/DSM-PC criteria and available for current use.**

A word about continuous performance tasks:

Various continuous performance tasks (CPT's) have been developed to attempt to objectively measure sustained and selective attention (TOVA, Gordon Diagnostic System, Conners CPT, etc.). 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.

**Evidence supporting these conclusions is of classes: C, R, D**

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

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.**

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 Annotations 5A-5E.

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 Annotations 5A-5E.

A second strategy would be to use a semi-structured interview format with some “key” questions designed to get at the disorders identified in the five previously described domains. (See Annotations 5A-5E.)

Another strategy includes the use of “screening” questionnaires which, although not diagnostic, can offer a general sense about potential areas of concern. One widely utilized instrument is the **Achenbach Child Behavior Checklist, Teacher Report Form, and Youth Self-report**. 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.

## Differential Diagnosis and Assessment of Comorbidity in Children with ADHD

### Biomedical Problems

- Perinatal complications
- Neurological (e.g., Tourette’s, seizure)
- Chromosomal abnormality (fragile X syndrome)
- Metabolic/Endocrine (e.g., hypothyroidism)
- Toxins/medications (e.g., lead)
- Iron deficiency
- Sensory impairment
- Chronic illness associated
- Sleep disorder

### Emotional/Psychiatric Problems

- Developmentally normal variation
- Anxiety disorder
- Depression/dysthymia/childhood mania-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 & 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

## Differential Diagnosis and Assessment of Comorbidity in Children with ADHD (cont)

Academic/Learning Problems

Cognitive impairment

Specific learning disability

Giftedness

Other learning style variations & dysfunction (e.g., memory, auditory discrimination problems)

See annotation #6 for concurrent assessment of suspected condition(s) and comorbidity(s).

Evidence supporting these conclusions is of classes: C, R

## 5A. Screen Biomedical Conditions

Note: the screening for the 5 domains (annotations 5A–5E) will provide data to suspect a differential diagnosis or data to suspect a diagnosis of ADHD. (See Annotation #6.)

### A. General Health History and Physical Examination, including:

- growth parameters: height, weight
- vital signs: blood pressure, pulse
- screening of vision and hearing

Special emphasis on:

#### 1. Overall physical appearance

- minor physical anomalies may signal genetic abnormalities (low-set ears, large or undescended testicles, high-arched palate, etc.)

#### 2. Signs and symptoms of abuse

#### 3. 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.

#### 4. Assessment of developmental status

A. Observation of child's activity level in examination room, ability to converse appropriately, ability to follow directions, and cooperativeness.

B. History of delays or questionable areas:

- Auditory perception
- Expressive language

- Visual and sequential processing
- Memory
- Fine and gross motor function

### C. 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 minutes or 10 minutes. (Memory, attention)
- Ask the child to repeat three, then four digits forward; then repeat three, then four digits backward. (Concentration)

## **5B. Screen Emotional/Psychiatric Problems**

The diagnosis of ADHD may be complicated by either the presence of another coexisting psychiatric condition or the existence of a psychiatric condition which has symptoms suggestive of the diagnosis of attention deficit hyperactivity disorder. It is clear that children with attention deficit hyperactivity disorder are at risk for the coexistence of depression, anxiety disorders, conduct disorders, and substance abuse. The prevalence of these conditions in children with ADHD ranges from 15 to 30 percent. At the same time it is those same four diagnostic entities which 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. The following may be considered as a starting point in evaluating the possible presence of depression, anxiety disorders, conduct disorders, and substance abuse.

### A. Depression

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

## B. Childhood Mania-Juvenile Bipolar Disorder

Recent experience suggests an overlap between ADHD and juvenile mania-bipolar disorder. The following are characteristics of childhood mania that may aid the clinician in differentiating the 2 conditions:

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

## C. Anxiety Disorder

The diagnosis of post traumatic stress disorder, which falls under the anxiety spectrum, may be the most common diagnosis which mimics ADHD. The most likely areas of post traumatic 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 which are likely to present themselves in childhood include those of separation anxiety disorder and generalized anxiety disorder. Screening which 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).
- The child finds it difficult to control or stop his or her worrying/anxiety.

## D. Conduct Disorder

- Presence of negativistic, hostile and defiant behaviors which 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).

## E. 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).

### F. Pervasive Developmental Disorders (e.g., Autistic Disorder, Asperger's Disorder)

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)
- restrictive, repetitive patterns of behavior (e.g., preoccupations, rituals, self-stimulatory motor mannerisms)

## 5C. Screen Family/Psychosocial Problems

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.

### A. Psychosocial stressors

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).

### B. Family History

Sample question: Has anyone in your family been treated for...?

Evaluate **all** the following for parents, siblings, and extended family:

- anxiety disorder
- depressive disorders (including bipolar disorder)
- learning/attention problems
- developmental delay, mental retardation, autism
- chemical dependency
- conduct problems
- other mental health problems

### C. 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 which 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 A above)
- 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?
- 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?

### 5D. Screen Speech/Language Problems

- A. Children with ADHD are more likely than non-disordered children to evidence difficulties in speech and language development, particularly difficulties with expressive language. Any history of speech or language delay or services should be discussed and reviewed. Common difficulties include:
- trouble following directions and retaining verbally presented information
  - historical or current problems with dysfluencies
  - disorganized speech on tasks that require verbal explanations
  - excessive, tangential, or rapid speech
  - problems with volume modulation
  - fragmented sentences with pauses
- B. Many children with ADHD manifest “pragmatic language dysfunction” in social situations; namely an inability to read essential verbal, nonverbal, and situational cues. This can lead to a tendency to make socially unacceptable choices. Over 50% of children with ADHD are likely to have communication/interaction problems that manifest themselves as social skills deficits. 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.
- C. 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. All children being evaluated for ADHD should have had their hearing screened within the previous 12 months. If questions arise, they should be referred to an audiologist for formal evaluation.

### 5E. Screen Academic/Learning Problems

- A. Children with ADHD are at increased risk of struggling academically and are frequently reported as underachieving. The history should include information from parents and teachers to assess common performance areas of difficulty in children with ADHD, which include:
- completion of independent work in a timely fashion
  - attention to detail
  - studying for exams
  - taking notes on classroom lectures
  - organizational skills
  - time management
  - self-monitoring
- B. 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/DSM-PC include:

- Reading disorder
- Mathematics disorder
- Disorder of written expression
- Developmental Coordination Disorder

C. 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 can be misdiagnosed as having a primary attentional problem when in fact their symptoms are secondary to an inappropriate level of difficulty or stimulation in academic programming.

D. Research has demonstrated that children with ADHD may also have difficulty with central auditory processing tasks. The overlapping symptomatology of ADHD and Central Auditory Processing Disorder (CAPD) may complicate the diagnostic picture. Children with CAPD may look inattentive. Central Auditory Processes are defined by the American Speech-Language-Hearing Association as the auditory system mechanisms and processes responsible for the following behavioral phenomena:

- sound localization and lateralization
- auditory discrimination
- auditory pattern recognition
- temporal aspects of audition
- auditory performance decrements with competing acoustic signals
- auditory performance decrements with degraded acoustic signals

Central Auditory Processing Disorder includes difficulty with the above items and presenting signs of CAPD may also include:

- behaves as if peripheral hearing loss is present despite normal hearing
- exhibits poor reading and spelling
- difficulty following multi step directions
- history of otitis media or peripheral hearing loss
- degradation of listening skills in the presence of background noise

For children presenting with these signs/symptoms, referral to a speech and language pathologist, educational psychologist, or audiologist is recommended for consideration of formal testing.

- E. 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 programming, “Chapter 1” assistance, etc.
  - history of early childhood service
- F. 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?
- G. Students functioning at the “gifted” end of the cognitive spectrum may also manifest signs/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.

## 6. Are Other Primary Condition(s) or Comorbidity(s) Suspected?

### Suspected Alternative Primary Condition

If an alternative primary diagnosis is suspected, the clinician is advised to proceed to step 7 and assist the patient in completion of appropriate evaluation prior to proceeding further in the guideline. In this instance, if an alternative primary diagnosis is identified which accounts for the presenting symptoms, the patient would be "out of guideline" and would be managed or referred as appropriate to the condition. (See annotation #8.) Possible examples might include anxiety disorders, depression, cognitive impairment, etc.

### Suspected ADHD with Comorbid Condition

If ADHD is the likely primary diagnosis but a comorbid condition is also suspected, the clinician may choose to proceed to step 11 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, learning disability, etc.

## 7. Assessment of Suspect Condition(s) and Comorbidity(s)

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.

Evidence supporting these conclusions is of classes: C, R

## 7A. Assess Biomedical Conditions

### Address Biomedical Conditions

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

1. Genetic or chromosomal
  - Fragile X syndrome
  - Mental retardation
  - Tourette syndrome
  - Neurofibromatosis
2. Neurological
  - Seizure disorder
  - Choreiform disorder
  - CNS trauma
  - Neurodegenerative conditions
  - CNS infection
3. Biomedical
  - Toxins [lead, fetal alcohol syndrome, prenatal cocaine exposure]
  - Allergy
  - Auditory or visual impairment
  - Metabolic/endocrine
  - Anemia
  - Sleep disorders

## 7B. Assess Emotional/Psychiatric Problems

If the clinician identifies sufficient positive symptomology after completion of these screening questions to raise the clinical suspicion of a psychiatric diagnosis, then referral to a mental health professional is indicated.

## 7C. Assess Family/Psychosocial Problems

If significant family pathology is present, then referral to a mental health professional, family therapist, or social services is appropriate.

## 7D. Assess Speech/Language Problems

If screening indicates concerns in these areas, referral to a speech and language pathologist for formal evaluation can be accomplished through a clinical speech/language pathologist or the student's school district.

## 7E. Assess Academic/Learning Problems

- If screening indicates concerns about academic and/or cognitive functioning and appropriate testing has not been done, the patient should be referred for individual evaluation. Parents and primary care providers should communicate first with the classroom teacher and share concerns. Teachers often have similar concerns and welcome the opportunity to discuss these with the child's parents and physician. Testing and needs assessment are the responsibility of the special educational staff and/or school psychologist for each district. Parents may make a request for evaluation at any time. All requests for evaluations should be made in writing and dated with a copy of the request kept. Licensed child psychologists are also capable of providing this type of educational testing and cognitive assessment.

### **IQ and Educational Testing**

Individual testing:

The IQ test most frequently used to assess school age children is the Wechsler Intelligence Scale for Children-Third Edition. The age range for administration is 6 years through 16 years 11 months. The WISC-III involves 12 subtests and yields a Verbal IQ Score, Performance IQ Score and Full Scale IQ Score with a Mean score of 100 and a standard deviation of 15 points. IQ scores range from 40-160; scores 130 and above are considered very superior, those 120-129 superior, 110-119 high average, 90-109 average, 80-89 low average, 70-79 borderline, and 69 and below cognitively deficient. Other intelligence tests include the Kaufman Assessment Battery for Children (K-ABC), the Stanford-Binet Fourth Edition (SB-4), and Woodcock Johnson Psychoeducational Battery (WJ-R) Tests of Cognitive Ability.

The Woodcock Johnson Psychoeducational Battery-Revised (WJ-R): Tests of Achievement are often used to in schools to look at academic achievement and yields scores in five clusters: Broad Reading, Broad Written Language, Broad Math, Broad Knowledge and Skills. Age and grade equivalent scores are available with a mean standard score of 100 and SD of 15. Other achievement tests include the Peabody Individual Achievement Test (PIAT-R), the Wide Range Achievement Test (WRAT-R), the Wechsler Individual Achievement Test (WIAT), and Key Math.

## **IQ and Educational Testing (cont)**

Group testing:

Group tests are also commonly administered, but results of group tests must be interpreted with caution and are not adequate for formal assessment purposes. Group tests include the Iowa Tests of Basic Skills, the Metropolitan Achievement Test, and the California Achievement Test. Scoring for these tests is based on national norms. Alternatively, some schools are utilizing “curriculum-based” measures which compare performance of students to district-defined learning goals.

## **8. Primary Diagnosis Other Than ADHD Accounting for Symptoms?**

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 which 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.

## **9. Related Comorbidity Identified?**

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

## **10. Desire Subspecialty Consultation for ADHD Medical Management?**

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

The type of medical subspecialty consultation may include the following:

Child-Adolescent Psychiatry

Developmental-Behavioral Pediatrics

Pediatric Neurology

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

## **11. DSM-IV/DSM-PC Criteria Confirmed?**

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

### 12. Out of Guideline - Need for Further Evaluation

For those patients not meeting DSM-IV/DSM-PC criteria and not having another condition identified, close monitoring and further evaluation of their learning or behavior problem is 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.

### 13. ADHD Diagnostic Formulation

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. It is crucial to discuss the child's and the family's strengths as well as their vulnerabilities.

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

## MANAGEMENT ALGORITHM ANNOTATIONS

### 16. ADHD Diagnostic Formulation

The patient has been diagnosed with attention deficit hyperactivity disorder with or without comorbidity. This diagnosis is based on the previous evaluation algorithm.

### 17. Multimodal Management Coordinated by Primary Clinician

After accurate diagnosis of attention deficit hyperactivity disorder, the underlying principle of successful management includes multiple treatment modalities begun simultaneously to address the multidimensional nature of the disorder. The primary clinician is in a unique position to coordinate these interventions from initial diagnosis through ongoing monitoring and continuing care. Subspecialty consultation at any point along this continuum may occur depending on the knowledge and expertise of the primary clinician as well as the complexity of the patient. Despite the need for individualized approaches, there are several general interventions and strategies which effectively address many of the common primary features of ADHD.

**Evidence supporting these conclusions is of classes: A, C**

### 18. Education of Key Individuals

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

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

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

For school personnel in contact with the child, one should not assume teacher knowledge of ADHD. It is important to provide specific teacher-focused information for the parents to share with all appropriate individuals. This information not only should explain ADHD related to the child's classroom difficulties, but also should address appropriate intervention strategies and modifications as described in Annotation 6.

### 19. Parents/Family Focused Strategies

#### ADHD Support Groups

These groups help parents learn more about ADHD through lectures, 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 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).

#### Parenting Skills Training

One of the most useful strategies a parent can undertake to improve harmony in the home is learn ways to modify the child's behavior in a manner consistent with school-focused behavior modification. This serves to give the child direction, goals and limits in hopes of improving compliance, behavior, self-esteem, etc. This training can be obtained through formal classes, books or counseling.

#### Suggestions for Parents

- 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.
- Try to spend 10–15 minutes daily focusing on this child alone to listen and let them know they are important.
- 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.
- Decrease inappropriate behavior by allowing:
  - natural consequences to the child's actions;
  - logical consequences linked to the offending behavior; and
  - time-outs.
- 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.
- Have the parent take a break or time-out from the child if he or she is becoming too frustrated or angry.
- Make sure the child knows his or her behavior is the issue or problem, not the child himself or herself.

The references in the discussion section contain a more detailed approach to parent skills training.

### **Comorbidity Present**

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

**Evidence supporting these conclusions is of classes: A, R**

## **20. Child Interventions**

The following interventions do not have solid empirical support for the treatment of ADHD and may be more appropriate to address deficits that often co-occur or develop secondarily in individuals with ADHD.

### **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 (i.e., unpredictable behavior). As a child gets older, unpredictable behavior is less tolerated by age mates 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 a lot of people (family, school, friends) offering the same message about appropriate behavior and may have a better chance of being generalized to a larger setting.

Social skills training (group or individual) instructs children in the execution of specific prosocial behaviors. 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. 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.

### **Study/Organizational Skills Training**

Study/organizational skills building should be offered in conjunction with curriculum intervention. The curriculum should be concrete and sequential with only essential information as a requirement. Specific interventions can address issues, such as:

- A. Behavior: Difficulty sequencing and completing steps to accomplish specific tasks (e.g., writing a book report or term paper, organized paragraphs; solving division problems)
- Accommodation: Break up task into workable and manageable component tasks. Provide examples to accomplish task.
- B. 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.

### **Co-Morbidity Present**

In children or adolescents with co-morbid anxiety, depression/dysthymia, chemical abuse, oppositional or conduct disorder; individual or family psychotherapy may be needed in addition to the above interventions. For medical comorbidity appropriate medical management should be implemented.

Evidence supporting these conclusions is of classes: **A, R, D**

## **21. School Interventions**

- A. Even at optimal doses of medication, most children with ADHD have residual difficulties at school. Physicians and other primary health care providers are often in a good position to assist parents in advocating for appropriate school programming for children with ADHD. Several classroom strategies are listed in the table below. 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.

Studies clearly demonstrate that combination therapy of medication and behavioral interventions for ADHD is superior to medication alone. The primary care provider can emphasize the fact that regardless of the decision to utilize or not utilize medication (e.g., stimulants); the literature supports the fact that children with ADHD clearly benefit from appropriate behavioral management and educational accommodations/modifications in the classroom.

### **B. 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, seating close to teacher and near positive peer models

## Classroom Strategies for Children with ADHD (cont)

- 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

- C. Ongoing collaboration and communication between teacher and primary care providers is desirable in order to discuss and implement effective treatment strategies for each child. It is also important for the primary care provider to communicate with school staff about their perceptions of the child's diagnosis (or diagnoses) with particular attention to any medical/neurologic problems (e.g., Tourette's, 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.
- D. 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 Impaired (OHI). Students with ADHD who do not meet eligibility criteria for the specific programs described (LD, EBD, OHI) 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 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.**

### Comorbidity 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 which 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.

**Evidence supporting these conclusions is of classes: A, R**

### 22. Medications Warranted and Desired?

Medication is frequently effective as part of a multimodal treatment plan for ADHD. The decision to use medication to alter behavior should be preceded by thorough deliberation and consideration of expected benefits and potential risks. The decision is influenced by factors such as the child's age, severity of symptoms, presence of co-morbidity, and negative or ambivalent parental attitudes regarding medication. A careful and thorough explanation about medications addressing fears, myths, or misconceptions that parents might have may be necessary for an informed consent.

### 23. Psychostimulant medication(s) trial(s)

Stimulant medications are considered first-line therapy as they are effective in 70–80% of children with ADHD. It is theorized that stimulants increase the availability of neurotransmitters at the presynaptic terminals. This allows the child to exhibit more purposeful, goal-oriented behavior by focusing attention, lessening impulsiveness, and decreasing motor activity.

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

The three types of stimulant medication most commonly used are:

- Methylphenidate (Ritalin®);
- Dextroamphetamine (Dexedrine®); and
- Amphetamine salts (Adderall®)

Response to one stimulant does not predict response to the others. Studies indicate a 70-80% response rate to each stimulant independent of one another; therefore, if a child is a non-responder to one stimulant, it is advisable to attempt a second or third trial with other stimulants. A particular benefit of dextroamphetamine or Adderall® is the reliability of the long acting Spansule capsules, with predictable absorption and onset of action, which makes it a good choice, especially for adolescents.

Each of these stimulant medications have the common emergent side effects of decreased appetite, insomnia, headache, stomach aches, and irritability. 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 methylphenidate or dextroamphetamine therapy.

Dosages should be adjusted for each child depending on body weight, degree of impairment, and specific symptoms targeted for improvement. Children with ADHD of the predominantly inattentive type have been shown to respond well to low doses of methylphenidate. Children with ADHD, combined-type or predominantly hyperactive, have shown more positive response at moderate to high doses of methylphenidate. (See Table I).

**Table I: Summary of first line ADHD medications for use in children and adolescents**

Medications	Starting Dose**	Titration & Timing of Doses	Predominant Adverse Effects	Comments
<b>Immediate Release</b>				
Methylphenidate (Ritalin) short-acting tablets (5, 10, 20 mg tabs) Dosage Range: 0.3-0.7 mg/kg/dose. (Total daily dose usually does not exceed 60 mg/day)	< 8yrs (<25kg) start with 5 mg/dose bid. >8yrs (>25kg) start with 10 mg/dose bid.	Increase by 2.5 – 5 mg/dose (depending on wt) am & noon; add 4pm dose as needed	decreased appetite, insomnia, headaches, increased HR	Adjust doses every 1-2 weeks as needed and tolerated
Dextroamphetamine (Dexedrine) short-acting tablets (5mg) Dosage Range: 0.2-0.4mg/kg/dose. (Total daily dose usually does not exceed 30mg/day)	Usually 5mg tablets bid.	Increased with 2.5 – 5 mg tab/dose; am & noon; add 4pm dose as needed	decreased appetite, insomnia, headaches, increased HR	Typical dextroamphetamine dose is approximately half of the equivalent methylphenidate dose.
<b>Sustained Release/Long Acting</b>				
Methylphenidate (Ritalin) long-acting (SR:20mg)	20mg SR in am only (considered for use in children tolerating 10 mg/dose am and noon)	Add 5mg - 10mg tablet in am and/or at 4pm	decreased appetite, insomnia, headaches, increased HR	Adjust doses every 1-2 weeks as needed and tolerated
Dextroamphetamine (Dexedrine) Long-acting spansules: 5, 10, 15 mg	Start at twice regular bid tablet dose (e.g., calculated by adding first 2 doses of the day together and administering an equal spansule amount in the am)	Increased with 5mg spansule in am only or add 5mg tablets to am dose	decreased appetite, insomnia, headaches, increased HR	Typical dextroamphetamine dose is approximately half of the equivalent methylphenidate dose.
Mixture of amphetamine salts (Adderall®) 5, 10, 20, 30 mg tablets	Start at 2.5 – 5 mg dose in am	Increase by 2.5 mg increments. Range for length of action is typically 5 – 8 hrs, depending on dose; can add second dose 6 – 7 hrs after am dose. Consider using tapered dose (smaller pm dose than am dose)	decreased appetite, insomnia, headaches, increased HR	Unique property – as dose increases, Adderall® will last longer

\* Bioavailability differences resulting in unpredictable patient response should be considered when using generics. Consider prescribing trade name product or evaluate the ANDA (Abbreviated New Drug Application) generic product data with the pharmacy when using a particular generic agent.

\*\* The notion that stimulants are primarily dosed by weight of the patient (e.g., 0.3 to 0.5 mg/kg/dose) is not entirely accurate. Studies would suggest that each individual's unique metabolic capacity for stimulants determines how they will respond. Therefore, in general, it may be wise to start at low doses for most patients (2.5-5 mg) and then titrate the dose upward instead of starting larger children on higher doses automatically.

Children less than 5 years of age are less likely to respond to stimulant medications and more likely to experience adverse effects. The starting dose of stimulant medications during adolescence is often lower, on a mg/Kg basis, than during elementary school children although gradual dosage titration is the same. (See table I.) Slow release formulation can often lessen school-related drug administration problems and patient resistance to taking medications.

Pharmacological treatment should be initiated by means of a trial, either placebo-controlled or open label. Trial should incorporate teacher and parent rating scales of performance.

## Placebo Controlled Methylphenidate (MPH) Trial

A placebo trial using FDA approved drugs and FDA recommended dosing is not a drug study and is not a legal issue. Placebo trials in this case are done to assist the provider in determining patient response. The use of placebo trials is a policy issue for each medical organization to determine within its own setting. Although placebo trials may not constitute a "study," clinicians are encouraged to discuss these trials with their respective IRB. It is advisable to obtain written parent/guardian consent before trials begin. It is also recommended that the child (at an age of understanding) be informed of the trial. Each medical group should determine its policy and procedure before implementation.

Placebo controlled trials for adolescents may utilize either methylphenidate or dextroamphetamine in the sustained release formulations. (See Table I.)

For selected patients (i.e. equivocal MPH response, parent reluctance to initiate stimulant therapy, etc.) the practitioner may elect to perform a placebo controlled medication trial.

Up to 20% of all children being considered for the diagnosis of ADD/ADHD may show a clinical response to a placebo. In order to avoid medicating children with MPH unnecessarily, and to help establish the proper treatment regimen, a blinded placebo trial may be helpful.

The use of a 3 or 4 week trial using a placebo and MPH doses of approximately 0.3 mg/kg and possibly 0.5 mg/kg, rounded to the nearest 2.5 mg, is recommended. Doses should be randomly distributed over a 3 or 4 week period. A dosage changeover may be important in identifying those children who respond to MPH only at higher doses.

### Suggested Trial Formats:

(1 week of each dosage in randomized order, given twice daily, approximately 4 hours apart)

<u>3 Week Trial</u>	<u>3 Week Trial</u>
MPH 5 mg	MPH 5 mg
MPH 5 mg	MPH 10 mg
Placebo	Placebo

Randomized order of dosages may be predetermined by the provider (single-blind) or by the pharmacist (double blind).

Considerations in determining the best trial format include age and weight of patient, severity of symptoms, reluctance to continue medication in the event of adverse side affects, and expected compliance of parents and teachers.

### Trial Instructions

Instruction sheets should be provided to the pharmacist, parents, and teachers.

Pharmacists should be instructed to place MPH tabs (5 mg) in appropriate amounts in placebo capsules. This ensures that the placebo will not be distinguished from MPH by taste or appearance. The medication is then dispensed in bottles labeled A, B, and C and given to the child twice daily.

It is advisable to have 24 hour access to pharmacy records during placebo trials.

Teachers should be requested to complete weekly questionnaires regarding ADHD symptoms and school performance. Additional comments should be encouraged from both teachers, parents, and older children. Completed questionnaires and comments should be returned to the provider at the completion of the trial.

Baseline questionnaire data, pre or post trial, may be obtained if a concern exists regarding patient as a placebo responder (responding to nonspecific effects of the medication).

### Follow-up

The pharmacist should provide the code for dosage distribution to the treating provider, who may then make appropriate therapeutic decisions based on the above information.

At the completion of the trial, questionnaire responses should be tabulated and parents should return to the clinic to discuss trial results and recommendations for ongoing treatment.

The purpose of the placebo controlled trial may be to determine if the medication is effective, not necessarily to determine the optimal dosage. Dosage may be further adjusted post trial if it has been determined that the patient responds positively to medication.

### Open Label Trial

#### Methylphenidate

- Dosage range (0.2 - 0.7 mg/kg/dose)
  - Typical dose range (5 - 25 mg/dose)
  - Frequency (1-2 doses per day initially)
1. Start at low end of dosage/dose range (usual starting dose 5mg<8 yrs. old, 10mg> 8 yrs old), and increase weekly or biweekly in increments of 2.5 — 5.0 mg/dose.
  2. Monitor dosing intervals with behavioral observations (eg. rating scales, self report in adol.) from as many observers as possible (at least parent, teacher). Observe for positive clinical response and adverse effects.
  3. Once adequate clinical response has been determined without prohibitive adverse effects, discuss with parent overall priorities of medication coverage (eg. classroom, homework, activities, family, etc.) and determine dose frequency and timing (2-3 doses/day, +-weekends).
  4. Schedule follow-up visit 4-8 weeks post trial to review care plan and adjustment as needed.
    - Dextroamphetamine may be used at approximately 1/2 the calculated methylphenidate dose.

**Evidence supporting these conclusions is of classes: A, C, R**

### **25. Alternative Medication Trial**

When adequate stimulant trial is unsuccessful due to either poor response or side effects in spite of adjustment, or if associated co-morbidity, alternative medication trials may be considered. Second line medications for ADHD therapy in these situations commonly include tricyclic antidepressants (imipramine, desipramine), alpha adrenergic agonist (clonidine) and a nontricyclic antidepressant (bupropion). At this point, due to increased side effects and more intense monitoring, the primary clinician is directed out of guideline and may consider subspecialty consultation depending upon individual knowledge and expertise. The table on the following page is provided for those clinicians considering alternative medication options:

**Table II: Summary of second line ADHD medications for use in children and adolescents\*\***

Medication	Starting Dose	Titration & Timing of Doses	Predominant Adverse Effects	Comments
Bupropion (Wellbutrin) 75 mg, 100 mg regular tablets  100 mg SR, 150 mg SR extended release tablets	6-12 yr; usually 37.5 mg BID or 50 mg BID  3 mg/Kg/day up to 150 mg/day	6-12 yr; gradually increase over 2 weeks to 6 mg/Kg/day up to 250 mg/day in divided doses (300 mg to 400 mg/day for adolescents)	Sedation, constipation, dryness of mouth, may lower seizure threshold	Further controlled studies needed. Some studies shows Bupropion may decrease hyperactivity and aggression, and improve cognitive performance of children with ADHD and CD. To reduce seizure risk, space regular tablets at least 4-6 hours apart and sustained release tablets 8 hours apart. Maximum single dose 150 mg and maximum daily dose 450 mg.
Clonidine (Catapres) tablets 0.1mg, 0.2mg & Transdermal Patch Catapres-TTS (transdermal therapeutic system) 1,2,3 = .1mg, 0.2mg, 0.3mg	Start with 0.05 mg QD.	Increased dose by 0.05 mg/day every 3 days to a max of 4 - 5 µg/kg/day (usually 0.05 mg QID)	Sedation, rashes with skin patch, orthostatic hypotension (<5% of those treated)	Possibly more effective for tics or marked impulsivity/aggression. Do not abruptly discontinue therapy.
Guanfacine (Tenex) tablets 1 mg, 2 mg	0.5 mg QD	Increase dose by 0.5 mg q 3-4 days to maximum of 4 mg/day in divided daily dose	Fatigue, headache, insomnia	Has longer 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.
Imipramine (Tofranil) tablets 10 mg, 25 mg, 50 mg	0.5-1.0mg/kg/day in divided doses	Increased 1mg/kg/wk up to 4mg/kg/day. Doses usually do not exceed 5mg/kg/day. (Divided doses are preferred.)	Cardiac conduction disturbances, dry mouth, urinary retention, headache	Therapy is usually reserved for older children or adolescents not responding to stimulants. Obtain baseline EKG and periodically monitor during therapy *
Desipramine*, + (Norpramine) tablets 10 mg, 25 mg, 50 mg	0.5-1.0 mg/kg/day in divided doses	Increased 1mg/kg/wk up to 4mg/kg/day. Doses usually do not exceed 5mg/kg/day. (Divided doses are preferred.)	Cardiac conduction disturbances, dry mouth, urinary retention, headache	Therapy is usually reserved for older children or adolescents not responding to stimulants. Obtain baseline EKG and periodically monitor during therapy *
Pemoline (Cylert) ** long-acting tablets: 18.75, 37.5, 75 mg, (37.5 mg chewable tab), + Dosage range: 37.5 mg to 75 mg; usually does not exceed a maximum dose of 112.5 mg/day.	Usually 37.5 mg in am only	Observe for 1-2 weeks before increasing by 18.75 mg per dose once in am only; add a 4pm dose as needed	Decreased appetite, insomnia, headaches, increased HR	Has longest duration of action t <sub>1/2</sub> =12 hrs).  Obtain baseline LFT's, repeat during first 3 months and every 6 months thereafter

+ EKG Monitoring Guidelines (Imipramine, Desipramine):

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

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

\*\* Recent issues related to the occurrence, severity and incidence of liver complications associated with Pemoline (Cylert) use suggest that this agent may not be an appropriate first line therapy in ADHD. Although the occurrence of complications appears infrequent, practitioners should exercise caution when using this agent and ensure ongoing assessment and monitoring of liver function. These complications appear to be idiosyncratic and not particularly dose-related.

## 26. Out of Guideline (Consider Subspecialist Consultation)

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

## 27. Maintenance and Continuing Care

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 co-morbid conditions.

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

Frequency:        closely by phone during trial and first several weeks  
                         clinic visit after trial to review care plan  
                         2 times per year depending on individual case (preferably during school year)

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

Medical:

- measurement
  - height, weight, blood pressure, pulse
- medication
  - dosage, timing, coverage priorities, duration

### 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 third dose late afternoon and weekend timed with homework
- impaired with family, peers
  - consider weekend/holiday/summer dosing in a proactive, planned manner (must not be reactive to specific behaviors)

### Discontinuing Medications:

1. Consider annually when stable and doing well.
2. Best when there are few transitions or demands (e.g., mid-school year).
3. Avoid at beginning of any school year, especially the start of junior/senior high school.
4. Trial off meds 2–4 weeks with close monitoring follow-up.

- positive attributes of medication
- side effects and their management (see Table III)
- laboratory as indicated
- behavior rating scales
  - especially if problems and anticipated medication adjustment
- alternative/complimentary medicine

Increasingly, parents are considering the use of alternative/complimentary 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, SSRI's and TCA's, to name a few. Therefore, it is important for pediatric health care providers to inquire about the use of these agents by children under their care in a non-judgmental fashion. Parents can then be educated appropriately about potential risks, benefits, side effects and drug interaction possibilities associated with a certain therapy

### Psychosocial:

- family functioning
- home behavior management
- peer relationships
- outside activities

Educational:

- ADHD symptoms
- child-teacher relationships, social functioning, general attitude
- academic performance, homework and study skills
- current interventions and supports
- review IEP or section 504 plan if appropriate

Psychological:

- perception of ADHD and treatment
- self esteem issues
- personal strengths and successes

Anticipatory Guidance:

- immediate and long-term expectations
- study/organizational skills
- behavior management
- updated reading materials and advocacy issues

Transitioning to Adulthood:

- identify adult health care provider for care transfer (this may require coordination with college health service)
- prioritize treatment to address target symptoms, level of impairment, and available resources (multiple modalities frequently useful), patient participation necessary
- emphasize vocational evaluation, counseling, and training as well as time management skills, organization, and study skills
- discuss relationship issues
- high index of suspicion for co-morbidity
- address risk of medication abuse by patient and peers
- stimulants may be less effective, consider alternative medications if indicated

Revise multimodal care management plan as needed.

**Evidence supporting these conclusions is of classes: A, C, R**

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

ADVERSE EFFECT	MANAGEMENT
Anorexia, Weight loss, Stomachache	<ul style="list-style-type: none"> <li>• administer dose with/ after meals</li> <li>• high caloric breakfast and snacks after school/bedtime</li> <li>• limit stimulant to high priority needs</li> <li>• check liver function tests with pemoline</li> <li>• consider dietitian referral for nutrition evaluation/ counseling</li> </ul>
Insomnia	<ul style="list-style-type: none"> <li>• low stress “wind down time” after school</li> <li>• administer dose earlier in day</li> <li>• discontinue afternoon/evening dose</li> <li>• change to short acting preparation</li> <li>• consider adjunctive medications (e.g. clonidine, antidepressants)</li> </ul>
Rebound irritability / moodiness (usually 4-5 hours after last dose)	<ul style="list-style-type: none"> <li>• overlap stimulant dosing</li> <li>• step down dosing</li> <li>• try long-acting or combination short/long-acting preparations</li> </ul>
Generalized irritability, dysphoria, agitation	<ul style="list-style-type: none"> <li>• assess timing of symptoms (e.g. peak withdrawal)</li> <li>• consider comorbid condition</li> <li>• reduce dose or change to long acting preparation</li> <li>• consider alternative/ adjunctive medication (e.g. another stimulant, antidepressant)</li> </ul>
Tics (simple vocal, motor)	<ul style="list-style-type: none"> <li>• monitor if mild, infrequent</li> <li>• weigh benefit-risk and discuss with parents</li> <li>• consider alternative medication (e.g. clonidine, guanfacine)</li> <li>• see Discussion #27 for further information</li> </ul>
Headache	<ul style="list-style-type: none"> <li>• assess timing</li> <li>• reduce dose with gradual return to therapeutic dose</li> <li>• try long acting preparation</li> <li>• consider alternative medication</li> </ul>
Linear growth impairment	<ul style="list-style-type: none"> <li>• limit stimulant to high priority needs (e.g., try weekend/ vacation drug “holidays”)</li> <li>• if significant, consider alternative medication</li> <li>• see Discussion #27 for further information</li> </ul>

### **28. Emerging comorbid condition?**

In the course of ongoing maintenance and continuing care the patient may develop features suggestive of an emerging co-morbid condition such as depression or dysthymia, anxiety, chemical abuse, conduct problems or antisocial behavior, family stress or dysfunction, etc. In these situations the primary clinician is directed to box 5 of the Evaluation Algorithm.

# Diagnosis and Management of Attention Deficit Hyperactivity Disorder in Primary Care

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# Discussion and References – Evidence Grading

## I. CLASSES OF RESEARCH REPORTS

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

Class A: Randomized, controlled trial

Class B: Cohort study

Class C: Non-randomized trial with concurrent or historical controls  
Case-control study  
Study of sensitivity and specificity of a diagnostic test  
Population-based descriptive study

Class D: Cross-sectional study  
Case series  
Case report

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

Class M: Meta-analysis  
Decision analysis  
Cost-benefit analysis  
Cost-effectiveness study

Class R: Review article  
Consensus statement  
Consensus report

Class X: Medical opinion

## EVALUATION ALGORITHM

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

The developmental changes in the characteristic symptoms of ADHD over time influence the presenting symptom profile. 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, anti-social behavior, and learning difficulties also have an influence on the ongoing course and prominence of certain symptoms.

DSM-IV/DSM-PC - based field trial data suggest that in the preschool age group, the hyperactive/impulsive subtype predominates with the comorbid type being seen most often in the school age child.

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

Applegate B, Lahey BB, Hart EL, et al. "Validity of the age-of-onset criterion for ADHD: a report from the DSM-IV field trials." *J Am Acad Child Adolesc Psychiatry* 36:1211-21, 1997. (Class C)

Werry JS. "History, terminology, and manifestations at different ages." *Child Adolesc Psychiatry Clin North Am* 1:297-310, 1992. (Class R)

Barkley RA, Fischer M, Edelbrock CS, et al. "The adolescent outcome of hyperactive children diagnosed by research criteria: I. An 8-year prospective follow-up study." *J Am Acad Child Adolesc Psychiatry* 29:546-57, 1990. (Class B)

Reiff MI. "Adolescent school failure: failure to thrive in adolescence." *Pediatr Rev* 19:199-207, 1998. (Class R)

### 2. Crisis?

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

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

Attention deficit hyperactivity disorder (ADHD) may have an impact on a child's/adolescent's experience within school, family, play or work. It is a high prevalence condition ranging in school aged children from 3-5%, based on previous diagnostic criteria, to 11-12%, based on more recent DSM-IV/DSM-PC criteria. It is a chronic condition which 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/DSM-PC classifies ADHD into 3 subtypes depending on the prevalence of specific behaviors - Predominantly Inattentive, Predominantly Hyperactive/Impulsive, and Combined Types. A summary of this information is presented immediately following the Evaluation algorithm.

Evaluation of the primary symptoms of ADHD requires multiple sources of information, including: a careful review of past medical and developmental history, current and previous school history, family history, and psychosocial history. Various semistructured interviews, questionnaires, and behavior rating scales are available to aid in this process (see the Discussion and References section). Continuous Performance Tasks have not proven to be reliable pathognomonic evaluation instruments in individual cases to diagnose or exclude ADHD at this point (see Annotations section).

The Diagnostic and Statistical Manual for Primary Care (DSM-PC) Child and Adolescent Version was developed to enhance communication between primary care and mental health clinicians. This manual describes children's symptoms along a continuum from normal developmental variations to problem behaviors to mental "disorders." It is fully compatible with the DSM-IV 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 (pp. 93–110).

Wolraich ML, Felice ME, Drotar DE, eds. The Classification of child and adolescent mental diagnoses in primary care: diagnosis and statistical manual for primary care (DSM-PC) child and adolescent version. Elk Grove Village, IL: American Academy of Pediatrics, 1996. (Class R)

Suggested Behavior Rating Scales:

ADHD-IV Rating Scale (see Implementation Section – Options for Action)

- Based on DSM-IV/DSM-PC criteria for ADHD
- Normed by age and sex
- Separates inattention and hyperactive/impulsive factors

Child Attention Profile (available in Barkley reference below)

- Based on inattention and overactive items from the Achenbach Child Behavior Check List
- Normed by sex
- Separates inattention and overactive factors

Conners Parent and Teacher Rating Scale

- Multiple scales assessing conduct, learning, psychosomatic, impulsive/hyperactive, and anxiety dimensions
- Some concern present over few items focusing on cognitive (inattention) vs. behavioral (hyperactive/impulsive) features of ADHD.

Numerous other rating scales are available which are multidimensional and more complex to score and interpret (Achenbach CBCL and TRF, ACTeRS, Yale Children's Inventory, ANSER, etc.). These may be helpful in evaluation of comorbid conditions (Discussion #5/7).

## Suggested Semistructured Interview / Questionnaires:

Barkley Clinical Interview (available in Barkley reference below).

BASC (Behavior Assessment System for Children) (available from Reynolds and Kamphaus reference below).

## Sources for Rating Scales, Interview Materials:

Barkley RA. Attention deficit hyperactivity disorder: a clinical workbook. New York: Guilford Press, 1991.

Reynold CR, Kamphaus RW. Behavior Assessment System for Children (BASC). Circle Pines, MN: American Guidance Service, 1992.

## References:

Spitzer RL, ed. Diagnostic and statistical manual of mental disorders, 4th ed. Washington DC: American Psychiatric Press, 1994: 63-65 (Class R)

Lahey BB, Applegate B, McBurnett K, et al. "DSM-IV field trials for attention deficit hyperactivity disorder in children and adolescents." *Am J Psychiatry* 151:1673-85, 1994. (Class C)

Matier-Sharma K, Perachio N, Newcorn JH, et al. "Differential diagnosis of ADHD: are objective measures of attention, impulsivity, and activity level helpful?" *Child Neuropsychol* 1:118-127, 1995. (Class C)

Cantwell DP. "Attention deficit disorder: a review of the past 10 years." *J Am Acad Child Adolesc Psychiatry* 35:978-87, 1996. (Class R)

DuPaul GJ, Anastopoulos AD, Shelton TL, et al. "Multimethod assessment of attention-deficit hyperactivity disorder: the diagnostic utility of clinic-based tests." *J Clin Child Psychol* 21:394-402, 1992. (Class C)

Wolraich ML, Hannah JN, Pinnock TY, et al. "Comparison of diagnostic criteria for attention-deficit hyperactivity disorder in a county-wide sample." *J Am Acad Child Adolesc Psychiatry* 35:319-24, 1996. (Class D)

DuPaul GJ, Power TJ, Anastopoulos AD, et al. ADHD Rating Scale - IV. New York: Guilford Press, 1998. (Class not assignable)

Wolraich ML, Felice ME, Drotar DE, eds. The Classification of child and adolescent mental diagnoses in primary care: diagnosis and statistical manual for primary care (DSM-PC) child and adolescent version. Elk Grove Village, IL: American Academy of Pediatrics, 1996. (Class R)

## 5/7. Screen/Assessment for Other Primary Conditions and Comorbidities

Children who have attentional problems represent a very diverse, heterogeneous population, and exhibit a broad range of symptom severity and a wide range of associated diagnoses. Up to 44% of children who have ADHD have at least one other psychiatric disorder, 32% have two other disorders, and 11% have three other disorders. 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 and 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. Therefore the diagnosis of ADHD should be applied with care and caution, only after an appropriately thorough evaluation.

Barkley RA, DuPaul GJ, McMurray MB. "Comprehensive evaluation of attention deficit disorder with and without hyperactivity as defined by research criteria." *J Consult Clin Psychol* 58:775-89, 1990. (Class C)

Biederman J, Newcorn J, Sprich S. "Comorbidity of attention deficit hyperactivity disorder with conduct, depressive, anxiety, and other disorders." *Am J Psychiatry* 148:564-77, 1991. (Class R)

Cantwell DP, Baker L. "Differential diagnosis of hyperactivity." *J Dev Behav Pediatr* 8:159-65, 1987. (Class R)

Biederman J, Faraone SV, Lapey K. "Comorbidity of diagnosis in attention-deficit hyperactivity disorder." *Child Adolesc Psychiatr Clin North Am* 1:335-60, 1992. (Class R)

Reiff MI. "Adolescent school failure: failure to thrive in adolescence." *Pediatr Rev* 19:199-207, 1998. (Class R)

### 5A/7A. Screen/Assess Biomedical Conditions

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 may result in classroom difficulties and produce restless or inattentive behaviors. Children with neuromaturational delays, or neurological "soft signs" are at risk for learning and behavioral disorders.

Kelly DP, Aylward GP. "Attention deficits in school-aged children and adolescents: current issues and practice." *Pediatr Clin North Am* 39:487-512, 1992. (Class R)

Murphy MA, Hagerman RJ. "Attention deficit hyperactivity disorder in children: diagnosis, treatment, and follow-up." *J Pediatr Health Care* 6:2-11, 1992. (Class R)

Wender EH. "Attention-deficit hyperactivity disorders in adolescence." *Dev Behav Pediatr* 16:192-95, 1995. (Class R)

### 5B/7B. Screen/Assess Emotional/Psychiatric Problems

The four most likely conditions which may coexist with or complicate the diagnosis of ADHD are depression, anxiety disorders, conduct disorders, and substance abuse. These conditions are found to coexist in 15–30% of patients. Often a primary diagnosis of a psychiatric condition is not made due to the commonality of ADHD symptoms seen in these conditions. It is therefore important to screen for these disorders when evaluating a child for possible ADHD.

Spitzer RL, ed. *Diagnostic and statistical manual of mental disorders*, 4th ed. Washington DC: American Psychiatric Press, 1994: 63-65 (Class R)

Biederman J, Newcorn J, Sprich S. "Comorbidity of attention deficit hyperactivity disorder with conduct, depressive, anxiety, and other disorders." *Am J Psychiatry* 148:564-77, 1991. (Class R)

Wozniak J, Biederman J, Kiely K, et al. "Mania-like symptoms suggestive of childhood-onset bipolar disorder in clinically referred children." *J Am Acad Child Adolesc Psychiatry* 34:867-76, 1995. (Class C)

Faraone SV, Biederman J, Wozniak J, et al. "Is comorbidity with ADHD a marker for juvenile-onset mania?" *J Am Acad Child Adolesc Psychiatry* 36:1046-54, 1997. (Class C)

Jensen VK, Larrieu JA, Mack KK. "Differential diagnosis between attention-deficit/hyperactivity disorder and pervasive developmental disorder—not otherwise specified." *Clin Pediatr* 36:555-61, 1997. (Class C)

### 5C/7C. Screen/Assess Family/Psychosocial Problems

#### A. Psychosocial Stressors

There is some evidence that children with ADHD and a concurrent depressive or anxious condition have higher levels of life stress and maternal psychiatric symptoms.

Jensen PS, Shervette RE, Xenakis SN, et al. "Anxiety and depressive disorders in attention deficit disorder with hyperactivity: new findings." *Am J Psychiatry* 150:1203-1209, 1993. (Class C)

Rostain AL. "Attention deficit disorders in children and adolescents." *Pediatr Clin North Am* 38:607-35, 1991. (Class R)

Simeon JG, Wiggins DM. "Pharmacotherapy of attention-deficit hyperactivity disorder." *Can J Psychiatry* 38:443-48, 1993. (Class R)

Spencer T, Biederman J, Wilens T, et al. "Pharmacotherapy of attention-deficit hyperactivity disorder across the life cycle." *J Am Acad Child Adolesc Psychiatry* 35:409-32, 1996. (Class R)

#### B. 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.

Barkley RA, DuPaul GJ, McMurray MB. "Comprehensive evaluation of attention deficit disorder with and without hyperactivity as defined by research criteria." *J Consult Clin Psychol* 58:775-89, 1990. (Class C)

Biederman J, Newcorn J, Sprich S. "Comorbidity of attention deficit hyperactivity disorder with conduct, depressive, anxiety, and other disorders." *Am J Psychiatry* 148:564-77, 1991. (Class R)

### 5D/7D. Screen/Assess Speech/Language Problems

Up to 50% of children with ADHD may show evidence of an expressive language problem. Deficits in verbal functioning may be chronic and are particularly common in adolescents with antisocial behavior.

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)
- loss of previously acquired language skills

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 > 6 months duration) may need referral to an otolaryngologist to evaluate for vocal cord nodules.

Patients with ADHD who have comorbid vocal tics or Tourette's may demonstrate speech patterns typical to this disorder including repetitive noises, throat clearing, barking or even coprolalia.

Children with hearing impairments can also have ADHD exclusive of their hearing problems. This can be a complicated differential diagnosis, possibly requiring specialty referral.

Giddan JJ. "Communication issues in attention-deficit hyperactivity disorder." *Child Psychiatry Hum Dev* 22:45-51, 1991. (Class R)

Cantwell DP, Baker L, Mattison R. "Prevalence, type, and correlates of psychiatric diagnosis in 200 children with communication disorder." *Dev Behav Pediatr* 2:131-36, 1981. (Class D)

Kelly D, Forney J, Parker-Fisher S, et al. "Evaluation and managing attention deficit disorder in children who are deaf or hard of hearing." *Am Ann Deaf* 138:349-57, 1993. (Class R)

### 5E/7E. Screen/Assess Academic/Learning Problems

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.

Prospective follow-up studies of children with ADHD into adolescence indicate that this population is at great risk for chronic underachievement and demonstrates higher school drop-out rates. About one-third of children with ADHD in research samples have been held back at least one grade before reaching high school.

One easy-to-use instrument for clinicians to screen academic functioning in students grades 1-6 is the Academic Performance Rating Scale. This instrument consists of 19 teacher-completed items which are scored to yield four subscale scores: Learning Ability, Academic Performance, Impulse Control and Social Withdrawal. A total score of 1.5 standard deviations below the mean for age and gender are considered significant for screening purposes and warrant consideration of referral for formal educational assessment.

DuPaul, G. "Academic Performance Rating Scale." In Attention deficit hyperactivity disorder: a handbook for diagnosis & treatment. New York: Guilford Press, 1994: 306-09. (Class not assignable)

If a child is referred to formal psychoeducational assessment it is important to differentiate the need for IQ testing, achievement testing or both. IQ testing gives a general estimate of personal problem-solving ability based on age norms. It is important to note that verbal and performance (or nonverbal) abilities may differ, and that children with language-based disorders might be penalized for this on a standard IQ test such as the WISC-III, resulting in an understestimation of their true ability. A less language-based instrument such as the Kaufman (K-ABC) may be preferable. A selected set of subtests on the WISC-III called the Freedom from Distractibility Factor (consisting of the scores on the arithmetic, coding and digit span subtests) is no longer felt to be strongly correlative to a diagnosis of ADHD.

Achievement testing on the other hand, looks at a child's actual skill level in specific academic areas such as reading, spelling, or math as compared to either age norms or grade norms. Differences between predicted ability (based on IQ) and actual performance in specific academic skill areas (as defined by individual achievement test scores) are examined to identify learning disabilities, general underachievement, or giftedness.

Cantwell DP, Baker L. "Association between attention deficit-hyperactivity disorder and learning disorders." *J Learn Disabil* 24:88-95, 1991. (Class R)

DuPaul G, Stoner G. ADHD in the schools: assessment and intervention strategies. New York: Guilford Press, 1994: 96-134. (Class not assignable)

Barkley RA. "ADHD and IQ." *The ADHD Report* 3:1-3, 1995. (Class R)

Werry JS, Elkind GS, Reeves JC. "Attention deficit, conduct, oppositional, and anxiety disorders in children: III. laboratory differences." *J Abnorm Child Psychol* 15:409-28, 1987. (Class C)

Research has demonstrated that a number of children with ADHD may also have difficulty with central auditory processing tasks.

Chermak GD, Somers EK, Seikel JA. "Behavioral signs of central auditory processing disorder and attention deficit hyperactivity disorder." *J Am Acad Audiol* 9:78-84, 1998. (Class C)

Cook JR, Mausbach T, Burd L, et al. "A preliminary study of the relationship between central auditory processing disorder and attention deficit disorder." *J Psychiatr Neurosci* 18:130-37, 1993. (Class A)

Riccio CA, Hynd GW, Cohen MJ, et al. "Comorbidity of central auditory processing disorder and attention-deficit hyperactivity disorder." *J Am Acad Child Adolesc Psychiatry* 6:849-57, 1994. (Class C)

American Speech-Language-Hearing Association. Task Force on Central Auditory Processing Consensus Development. "Central auditory processing: current status of research and implications for clinical practice." *Am J Audiol* 5:41-54, 1996. (Class R)

### 13. ADHD Diagnostic Formulation

Garfinkel BD, Amrami KK. "Assessment and differential diagnosis of attention-deficit hyperactivity disorder." *Child Adolesc Psychiatr Clin North Am* 1: 311-324, 1992. (Class R)

Reiff MI, Banez GA, Culbert TP. "Children who Have Attentional Disorders: Diagnosis and Evaluation." *Pediatr Rev*12:455-465, 1993. (Class R)

## MANAGEMENT ALGORITHM

### 17. Multimodal Management Coordinated by Primary Clinician

The multimodal treatment model for ADHD allows for simultaneous interventions resulting in effective management for the range of problems children with ADHD experience. Several studies have documented that the combination of intervention strategies result in consistently more positive short term results compared to the same strategies used individually. A management plan might include proven treatments such as parent-child education, medication, behavior management training, cognitive training, social skill training, and academic support.

Satterfield JH, Satterfield BT, Cantwell DP. "Three-year multimodality treatment study of 100 hyperactive boys." *J Pediatr* 98:650-55, 1981. (Class C)

Pelham WE Jr, Carlson C, Sams SE, et al. "Separate and combined effects of methylphenidate and behavior modification on boys with attention deficit-hyperactivity disorder in the classroom." *J Consult Clin Psychol* 61:506-15, 1993. (Class A)

### 19. Parents/Family Focused Strategies

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 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 TL, Barkley RA. "The role of parent training groups in the treatment of attention-deficit hyperactivity disorder." *Child Adolesc Psychiatr Clin North Am* 1:519-36, 1992. (Class R)

Horn WF, Ialongo N, Popovich S, et al. "Behavioral parent training and cognitive-behavioral self-control therapy with ADD-H children: comparative and combined effects." *J Clin Child Psychol* 16:57-68, 1987. (Class A)

### 20. Child Interventions

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 their own environment and interpersonal relationships and choosing a vocation. 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.

Pelham WE Jr, Wheeler T, Chronis A. "Empirically supported psychosocial treatments for attention deficit hyperactivity disorder." *J Clin Child Psychol* 27:190-205, 1998. (Class R)

Shapiro E, Cole C. Behavior change in the classroom: self-management interventions. New York: Guilford Press, 1994: 14-17. (Class R)

Minnesota Department of Education. Accommodations for dealing with specific behaviors of children with attention deficit disorders. Minnesota Department of Education, April 1993. (Class R)

#### Social Skills

Guevremont DC, Foster SL. "Impact of social problem-solving training on aggressive boys: skill acquisition, behavior change, and generalization." *J Abnorm Child Psychol* 21:13-28, 1993. (Class D)

Kazdin AE, Bass D, Siegel T, et al. "Cognitive-behavioral therapy and relationship therapy in the treatment of children referred for antisocial behavior." *J Consult Clin Psychol* 57:522-35, 1989. (Class A)

Shapiro E, Cole C. Behavior change in the classroom: self-management interventions. New York: Guilford Press, 1994: 14-17. (Class R)

#### Problem Solving Training

Fehlings DL, Roberts W, Humphries T, et al. "Attention deficit hyperactivity disorder: does cognitive behavioral therapy improve home behavior?" *J Dev Behav Pediatr* 12:223-28, 1991. (Class A)

Hinshaw SP, Henker B, Whalen CK. "Cognitive-behavioral and pharmacologic interventions for hyperactive boys: comparative and combined effects." *J Consult Clin Psychol* 52:739-49, 1984. (Class A)

Pelham WE, Sams SE. "Behavior modification." *Child Adolesc Psychiatr Clin North Am* 1:505-18, 1992. (Class R)

### Study/Organizational Skills

Minnesota Department of Education. Accommodations for dealing with specific behaviors of children with attention deficit disorders. Minnesota Department of Education, April 1993. (Class R)

## 21. School Interventions

Studies clearly demonstrate that combination therapy for ADHD (i.e., medication plus behavioral interventions) is superior to medication alone. The primary care provider can emphasize the fact that regardless of the decision to utilize or not utilize medication (e.g., stimulants), the literature would support the fact that children with ADHD clearly benefit from appropriate behavioral management and educational accommodations/modifications in the classroom.

Primary care providers should explore opportunities for services and supports for the child with ADHD that are available within their school with school personnel and parents.

Carlson CL, Pelham WE Jr, Milich R, et al. "Single and combined effects of methylphenidate and behavior therapy on the classroom performance of children with attention-deficit hyperactivity disorder." *J Abnorm Child Psychol* 20:213-32, 1992. (Class A)

Pelham WE Jr, Carlson C, Sams SE, et al. "Separate and combined effects of methylphenidate and behavior modification on boys with attention deficit-hyperactivity disorder in the classroom." *J Consult Clin Psychol* 61:506-15, 1993. (Class A)

Fowler M. The educators manual: an in-depth look at attention deficit disorders from an educational perspective. Plantation, FL: CHADD, 1992. (Class R)

DuPaul G, Stoner G. ADHD in the Schools: assessment and intervention strategies. New York: Guilford Press, 1994: 96-134. (Class not assignable)

Whalen CK, Henker B. "Therapies for hyperactive children: comparisons, combinations, and compromises." *J Consult Clin Psychol* 59:126-37, 1991. (Class R)

Pelham WE, Sams SE. "Behavior modification." *Child Adolesc Psychiatr Clin North Am* 1:505-18, 1992. (Class R)

Hinshaw SP. "Academic underachievement, attention deficits, and aggression: comorbidity and implications for intervention." *J Consult Clin Psychol* 60:893-903, 1992. (Class R)

Bloomquist ML, August GJ, Ostrander R. "Effects of a school-based cognitive-behavioral intervention for ADHD children." *J Abnorm Child Psychol* 19:591-605, 1991. (Class A)

## 22. Medications Warranted and Desired?

Goldman LS, Genel M, Bezman RJ, et al. "Diagnosis and treatment of attention-deficit/hyperactivity disorder in children and adolescents." *JAMA* 279:1100-1107, 1998. (Class R)

### 23. Psychostimulant Medication(s) Trial(s)

#### General references

- Barkley RA, DuPaul GJ, McMurray MB. "Attention deficit disorder with and without hyperactivity: clinical response to three dose levels of methylphenidate." *Pediatr* 87:519-31, 1991. (Class A)
- DiTraglia J. "Methylphenidate protocol: feasibility in a pediatric practice." *Clin Pediatr* 30:656-60, 1991. (Class A)
- Greenhill LL. "Pharmacologic treatment of attention deficit hyperactivity disorder." *Psychiatr Clin North Am* 15:1-27, 1992. (Class R)
- McBride MC. "An individual double-blind crossover trial for assessing methylphenidate response in children with attention deficit disorder." *J Pediatr* 113:137-45, 1988. (Class A)

#### References for Table I: Summary of first line ADHD medications for use in children and adolescents

- Kelly DP, Aylward GP. "Attention deficits in school-aged children and adolescents: current issues and practice." *Pediatr Clin North Am* 39:487-512, 1992. (Class R)
- Murphy MA, Hagerman RJ. "Attention deficit hyperactivity disorder in children: diagnosis, treatment, and follow-up." *J Pediatr Health Care* 6:2-11, 1992. (Class R)
- Rostain AL. "Attention deficit disorders in children and adolescents." *Pediatr Clin North Am* 38:607-35, 1991. (Class R)
- Simeon JG, Wiggins DM. "Pharmacotherapy of attention-deficit hyperactivity disorder." *Can J Psychiatry* 38:443-48, 1993. (Class R)
- Spencer T, Biederman J, Wilens T, et al. "Pharmacotherapy of attention-deficit hyperactivity disorder across the life cycle." *J Am Acad Child Adolesc Psychiatry* 35:409-32, 1996. (Class R)
- Wender EH. "Attention-deficit hyperactivity disorders in adolescence." *Dev Behav Pediatr* 16:192-95, 1995. (Class R)
- Pelham WE, Greenslade KE, Vodde-Hamilton M, et al. "Relative efficacy of long-acting stimulants on children with attention deficit-hyperactivity disorder: a comparison of standard methylphenidate, sustained-release methylphenidate, sustained-release dextroamphetamine, and pemoline." *Pediatr* 86:226-37, 1990. (Class A)
- Committee on Bioethics, American Academy of Pediatrics. "Informed consent, parental permission, and assent in pediatric practice." *Pediatr* 95:314-17, 1995. (Class R)
- Committee on Drugs, American Academy of Pediatrics. "Guidelines for the ethical conduct of studies to evaluate drugs in pediatric populations." *Pediatr* 95:286-94, 1995. (Class R)
- Gross-Tsur V, Manor O, van der Meere J, et al. "Epilepsy and attention deficit hyperactivity disorder: is methylphenidate safe and effective?" *J Pediatr* 130:40-4, 1997. (Class C)
- Castellanos FX, Giedd JN, Elia J, et al. "Controlled stimulant treatment of ADHD and comorbid Tourette's syndrome: effects of stimulant and dose." *J Am Acad Child Adolesc Psychiatry* 36:589-96, 1997. (Class A)
- Efron D, Jarman F, Barker M, et al. "Side effects of methylphenidate and dexamphetamine in children with attention deficit hyperactivity disorder: a double-blind, crossover trial." *Pediatr* 100:662-66, 1997. (Class A)

Greenhill LL, Halperin JM, Abikoff H. "Stimulant medications." *J Am Acad Child Adolesc Psychiatry* 38:503-12, 1999. (Class R)

Gillberg C, Melander H, von Knorring A-L, et al. "Long-term stimulant treatment of children with attention-deficit hyperactivity disorder." *Pediatr* 103:e43, 1999. (Class A)

Berman T, Douglas VI, Barr RG. "Effects of methylphenidate on complex cognitive processing in attention-deficit hyperactivity disorder." *J Abnorm Psychol* 108:90-105, 1999. (Class C)

Manos MJ, Short EJ, Findling RL. "Differential effectiveness of methylphenidate and adderall® in school-age youths with attention-deficit/hyperactivity disorder." *J Am Acad Child Adolesc Psychiatry* 38:813-19, 1999. (Class C)

Swanson JM, Wigal S, Greenhill LL, et al. "Analog classroom assessment of adderall® in children with ADHD." *J Am Acad Child Adolesc Psychiatry* 37:519-26, 1998. (Class A)

Ten Eick AP, Nakamura H, Reed MD. "Drug-drug interactions in pediatric psychopharmacology." *Pediatr Clin North Am* 45:1233-64, 1998. (Class R)

## 25. Alternative Medication(s) Trial(s)

For the few patients where psychostimulants are not effective, result in significant side effects, or where an associated co-morbidity is present; several alternative medications have been shown to be more effective than placebo for ADHD symptoms. Included in these are the tricyclic antidepressants imipramine and desipramine, the alpha adrenergic agonist clonidine, and the non-tricyclic antidepressant bupropion. Various controlled and open studies support the use of these agents in selected children and adolescents depending on clinical presentation and type of co-morbid condition.

Biederman, J, Baldessarini RJ, Wright V, et al. "A double-blind placebo controlled study of desipramine in the treatment of ADD: II. serum drug levels and cardiovascular findings." *J Am Acad Child Adolesc Psychiatry* 6:903-11, 1989. (Class C)

Werry, JS, Aman MG, Diamond E. "Imipramine and methylphenidate in hyperactive children." *J Child Psychol Psychiatry* 21:27-35, 1980. (Class A)

Casat CD, Pleasants DZ, Van Wyck Fleet J. "A double-blind trial of bupropion in children with attention deficit disorder." *Psychopharmacol Bull* 23:120-22, 1987. (Class A)

Hunt RD, Minderaa RB, Cohen DJ. "Clonidine benefits children with attention deficit disorder and hyperactivity: report of a double-blind placebo-crossover therapeutic trial." *J Amer Acad Child Adol Psychiatry* 5:617-29, 1985. (Class A)

### References for Table II: Summary of second line ADHD medications for use in children and adolescents

Greenhill LL. "Pharmacologic treatment of attention deficit hyperactivity disorder." *Psychiatr Clin North Am* 15:1-27, 1992. (Class R)

Kelly DP, Aylward GP. "Attention deficits in school-aged children and adolescents: current issues and practice." *Pediatr Clin North Am* 39:487-512, 1992. (Class R)

Murphy MA, Hagerman RJ. "Attention deficit hyperactivity disorder in children: diagnosis, treatment, and follow-up." *J Pediatr Health Care* 6:2-11, 1992. (Class R)

Simeon JG, Wiggins DM. "Pharmacotherapy of attention-deficit hyperactivity disorder." *Can J Psychiatry* 38:443-48, 1993. (Class R)

- Spencer T, Biederman J, Wilens T, et al. "Pharmacotherapy of attention-deficit hyperactivity disorder across the life cycle." *J Am Acad Child Adolesc Psychiatry* 35:409-32, 1996. (Class R)
- Wender EH. "Attention-deficit hyperactivity disorders in adolescence." *Dev Behav Pediatr* 16:192-95, 1995. (Class R)
- Green WH. "The treatment of attention-deficit hyperactivity disorder with nonstimulant medications." *Psychiatr Clin North Am* 4:169-83, 1995. (Class R)
- Ryan ND. "The pharmacologic treatment of child and adolescent depression." *Psychiatr Clin North Am* 15:29-36, 1992. (Class R)
- Wilens TE, Biederman J, Baldessarini RJ, et al. "Cardiovascular effects of therapeutic doses of tricyclic antidepressants in children and adolescents." *J Am Acad Child Adolesc Psychiatry* 35:1491-1501, 1996. (Class R)
- Hunt RD, Arnsten A, Asbell MD. "An open trial of guanfacine in the treatment of attention-deficit hyperactivity disorder." *J Am Acad Child Adolesc Psychiatry* 34:50-54, 1995. (Class D)
- Swanson JM, Wigal S, Greenhill LL, et al. "Analog classroom assessment of adderall in children with ADHD." *J Am Acad Child Adolesc Psychiatry* 37:519-26, 1998. (Class A)
- Barrickman LL, Perry PJ, Allen AJ, et al. "Bupropion versus methylphenidate in the treatment of attention-deficit hyperactivity disorder." *J Am Acad Child Adolesc Psychiatry* 34:649-57, 1995. (Class A)
- Conners CK, Casat CD, Gualtieri CT, et al. "Bupropion hydrochloride in attention deficit disorder with hyperactivity." *J Am Acad Child Adolesc Psychiatry* 35:1314-21, 1996. (Class A)
- Marotta PJ, Roberts EA. "Pemoline hepatotoxicity in children." *J Pediatr* 132:894-97, 1998. (Class D)

### 27. Maintenance and Continuing Care

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; while 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 recently 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. Furthermore, Gadow, et al., studied 34 prepubertal children with ADHD and chronic multiple tic disorder at 6-month and 2-year intervals, again revealing no evidence that motor or vocal tics changed in frequency or severity during maintenance therapy compared with initial evaluation.

Growth suppression has been a concern with long term use of stimulants. It seems to occur rarely and is likely secondary to reduced caloric intake. Upon discontinuing the stimulant, growth rebound occurs with no significant compromise of ultimate height attained. Findings by Vincent, et al., (in 31 adolescents receiving methylphenidate for 6 mos-6 yrs) suggest that there is no significant adverse effect on early adolescent growth with this treatment.

Barkley, RA, McMurray MB, Edelbrock CS, et al. "Side effects of methylphenidate in children with attention deficit hyperactivity disorder: a systemic, placebo-controlled evaluation." *Pediatr* 86:184-92, 1990. (Class A)

Gadow, KD, Sverd J, Sprafkin J, et al. "Efficacy of methylphenidate for attention-deficit hyperactivity disorder in children with tic disorder." *Arch Gen Psychiatry* 52:444-55, 1995. (Class A)

Vincent J, Varley CK, Leger P. "Effects of methylphenidate on early adolescent growth." *Am J Psychiatry* 147:501-02, 1990. (Class D)

Castellanos FX, Giedd JN, Elia J, et al. "Controlled stimulant treatment of ADHD and comorbid Tourette's syndrome: effects of stimulant and dose." *J Am Acad Child Adolesc Psychiatry* 36:589-96, 1997. (Class A)

Biederman J, Faraone S, Milberger S, et al. "A prospective 4-year follow-up study of attention-deficit hyperactivity and related disorders." *Arch Gen Psychiatry* 53:437-46, 1996. (Class C)

Rao JK, Julius JR, Breen TJ, et al. "Response to growth hormone in attention deficit hyperactivity disorder: effects of methylphenidate and pemoline therapy." *Pediatr* 102:497-500, 1998. (Class C)

Spencer T, Biederman J, Wilens T. "Growth deficits in children with attention deficit hyperactivity disorder." *Pediatr* 102:501-06, 1998. (Class R)

Smith BH, Pelham WE, Gnagy E, et al. "Equivalent effects of stimulant treatment for attention-deficit hyperactivity disorder during childhood and adolescence." *J Am Acad Child Adolesc Psychiatry* 37:314-21, 1998. (Class C)

Efron D, Jarman F, Barker M, et al. "Side effects of methylphenidate and dexamphetamine in children with attention deficit hyperactivity disorder: a double-blind, crossover trial." *Pediatr* 100:662-66, 1997. (Class A)

Law SF, Schachar RJ. "Do typical clinical doses of methylphenidate cause tics in children treated for attention-deficit hyperactivity disorder?" *J Am Acad Child Adolesc Psychiatry* 38:944-51, 1999. (Class A)

Spencer T, Biederman J, Wilens T. "Growth deficits in children with attention deficit hyperactivity disorder." *Pediatr* 102:201-06, 1998. (Class R)

Pliszka SR. "Comorbidity of attention deficit/hyperactivity disorder with psychiatric disorder: an overview." *J Clin Psychiatry* 59(suppl 7):50-58, 1998. (Class R)

Gadow KD, Sverd J, Sprafkin J, et al. "Long term methylphenidate therapy in children with comorbid attention-deficit hyperactivity disorder and chronic multiple tic disorder." *Arch Gen Psychiatry* 56:330-36, 1999. (Class D)

### Reference for Table III: Management of Common Adverse Effects Associated with Stimulant Use

Wilens TE, Biederman J. "The stimulants." *Psychiatr Clin North Am* 15:191-222, 1992. (Class R)

ADHD is a chronic condition with features lasting variably throughout childhood, adolescence, and into adulthood in many persons. Current experience reveals that the outcome of adolescents and adults with ADHD is variable as a group and based on individual factors. Most hyperactivity resolves by puberty, with degrees of inattentiveness, restlessness, and impulsivity persisting in about 50-60% of adolescents and young adults.

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. (eg. school, work, family).

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

Lambert, NM, Hartsough CS, Sassone D, et al. "Persistence of hyperactivity symptoms from childhood to adolescence and associated outcomes." *Amer J Orthopsychiatry* 57:22-32, 1987. (Class C)

DuPaul, GJ, Guevremont DC, Barkley RA. "Attention deficit-hyperactivity disorder in adolescence: critical assessment parameters." *Clin Psychol Rev* 11:231-45, 1991. (Class R)

Dulcan M. "Practice parameters for the assessment and treatment of children, adolescents, and adults with attention-deficit/hyperactivity disorder." *J Am Acad Child Adolesc Psychiatry* 36(10 Supplement):085S-121S, 1997. (Class R)

**Diagnosis and Management of Attention Deficit  
Hyperactivity Disorder in Primary Care**

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When measuring for improvement, it is critical that the measurements used are responsive to individual medical groups, and support medical groups' own clinical improvements. The following section of Specifications for Selected Measures is included in the guideline document to serve as an aid to the medical groups' own implementation efforts. It is likely that medical groups may need to adapt these measures to specific clinical practice or administrative systems.

## OVERVIEW OF IDEAS FOR MEASUREMENT

The following aims were identified by the guideline work group as key areas in which medical groups may receive benefits in implementing this guideline.

The measures associated with these aims are presented as possible measures. Measures of aim help medical groups determine progress in achieving that aim. The possible measures listed are suggestions from the work group. However, other approaches may be customized by individual medical groups to ferret out improvement information important to the medical group's individual practice.

## PRIORITY AIMS FOR MEDICAL GROUPS WHEN USING THIS GUIDELINE

1. Increase the use of DSM-IV or DSM-PC criteria and screening for other primary conditions and comorbidities for patients newly diagnosed with attention deficit hyperactivity disorder.

Possible measures of accomplishing this aim:

- a. Percentage of patients newly diagnosed with ADHD whose medical record contains documentation of DSM-IV or DSM-PC criteria.
- b. Percentage of patients newly diagnosed with ADHD whose medical record contains documentation of screening for other primary conditions and co-morbidities, as defined in the guideline.

2. Improve the primary care use of psychostimulant medications through a systematic, uniform approach.

Possible measures of accomplishing this aim:

- a. Percentage of patients diagnosed with ADHD whose medical record contains documentation that the clinician performed an open label or placebo controlled stimulant medication trial.
- b. Percentage of patients diagnosed with ADHD and on psychostimulant medication whose medical record contains documentation of a follow-up visit at least twice a year.

3. Increase the number of clinicians who are utilizing a multimodality approach in treatment planning for children with ADHD.

Possible measures of accomplishing this aim:

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

# Measurement – Specifications

## Possible Success Measure # 1a:

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

## Population Definition

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

## Data of Interest

$$\frac{\text{\# of medical records of newly diagnosed ADHD patients with documentation of DSM-IV or DSM-PC criteria}}{\text{Total \# of medical records reviewed}}$$

## Numerator/Denominator Definitions

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

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

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

## Method/Source of Data Collection

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

## Time Frame Pertaining to Data Collection

Suggested data collection time frame is monthly.

## Notes

Depending upon the size of the medical group's ADHD population, you may choose to collect the data on a less frequent basis.

# Measurement – Specifications (cont)

## Possible Success Measure # 2b:

Percentage of patients diagnosed with ADHD and on psychostimulant medication whose medical record contains documentation of a follow-up visit twice a year.

## Population Definition

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

## Data of Interest

$$\frac{\text{\# of medical records of ADHD patients on psychostimulant medication with documentation of a follow-up visit twice a year}}{\text{Total \# of ADHD patients on psychostimulants whose medical records reviewed}}$$

## Numerator/Denominator Definitions

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

**Denominator:** ADHD is defined as ICD-9 codes of 314.00 or 341.01. Diagnosed is defined as documented ADHD in the past 6-12 months. Psychostimulant medications include: methylphenidate (Ritalin), Dextroamphetamine (Dexedrine) and Pemoline (Cylert).

## Method/Source of Data Collection

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

## Time Frame Pertaining to Data Collection

Suggested data collection time frame is monthly.

## Notes

Depending upon the size of the medical group's ADHD population, you may choose to collect the data on a less frequent basis.

# Measurement – Specifications (cont)

## Possible Success Measure # 3a:

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

## Population Definition

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

## Data of Interest

$$\frac{\# \text{ of medical records of ADHD patients with documentation of discussion of the need for school based supports and educational service options}}{\text{Total \# of ADHD patients whose medical records are reviewed}}$$

## Numerator/Denominator Definitions

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

**Denominator:** ADHD is defined as ICD-9 codes of 314.00 or 341.01. Diagnosed is defined as documented ADHD in the past 6-12 months.

## Method/Source of Data Collection

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

## Time Frame Pertaining to Data Collection

Suggested data collection time frame is monthly.

## Notes

Depending upon the size of the medical group's ADHD population, you may choose to collect the data on a less frequent basis.