ADHD Guideline Team

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Attention-Deficit Hyperactivity Disorder

Patient population. Children and young adults age 3 to 30 years. Considerations for preschool children (3-5) and adults (18-30) are discussed (see Special Populations).

Objectives.
1. Recognize and treat ADHD early in the primary care setting.
2. Identify appropriate treatment options and drug side effects.
3. Identify common co-morbidities and indications for referral.
4. Identify appropriate support resources for patients and their families.

Key Points

Epidemiology

Common. ADHD is the most common behavioral disorder in school-age children – a U.S. community prevalence of 6-8% that is more common in boys *[C]*. In at least 30% of diagnosed children ADHD continues into adulthood, with 3-4% of adults meeting criteria for ADHD *[C]*.

Primary care provider. Most children with ADHD receive care through primary care physicians.

Diagnosis

Types. Diagnosis is based on the DSM-IV-TR criteria (see Table 1) *[D]*. The three main types are primary hyperactive, primary inattentive, and combined.

Multiple sources. No specific test can make the diagnosis. Input from both parents and teachers or other source is required. Some psychological rating tools are useful but are not diagnostic (e.g., Vanderbilt, Conners; see Figure 1, Tables 1 & 2, and Appendix A1). If a learning problem is suspected, consider neuropsychiatric testing for intelligence testing (IQ) and learning disorders.

Confused and associated conditions. Diagnosis is complicated by overlapping symptoms or co-occurrence of other disorders (e.g., anxiety disorders, bipolar disorder, obstructive sleep apnea, fetal alcohol syndrome, major depressive disorders, learning disorders, oppositional defiant disorder, post traumatic stress disorder, reactive attachment disorder; see Appendices B1 & B2).

Treatment (See Table 4)

Drug treatment

- Stimulants are the first line treatment and have proven benefit to most people. If one class of stimulant fails or has unacceptable side effects then another should be tried (Tables 5-7) *[IA*]*.
- Atomoxetine is a secondary choice *[IA]*. (One reported side effect is suicidal thinking.)
- Other medications may be used alone or in combination depending upon the ADHD type, response to therapy or comorbidity profile: e.g., Alpha-II agonists (clonidine, guanfacine) with hyperactivity or impulsivity; bupropion (over age 8) with co-morbid depression; risperidone (atypical antipsychotic) for aggression (see Table 7) *[IIA]*.
- Comorbid conditions may require additional treatment (e.g., for depression) and consideration of referral to a mental health specialist.

Non-pharmacologic interventions

- Age-appropriate behavioral interventions at home: education and support *[IB]*; parent interventions including routines, clear limits and positive reinforcement for target behaviors (for children); consider family therapy; cognitive behavioral techniques for adults *[IIB]* (see Table 8 and Appendix A2).
- School interventions: children with ADHD may qualify for a 504 education plan or special education services with individualized education plan (IEP) *[ID]* (see Appendices A3 & A4).

Special Populations or Circumstances

Special considerations apply to: 3-5 year olds, adolescents and adults, head-injured, intellectually disabled/autistic, fetal alcohol syndrome, and substance-abusing patients (see Appendix B3).

Controversial Areas

Common myths. Several common beliefs related to ADHD are untrue, e.g., that it is not a real disorder, it is an over-diagnosed disorder, children with ADHD are over-medicated.

Diets. Although a few studies suggest dietary modification may have promise, there is no proof of efficacy (e.g., individually tailored hypoallergenic diets, essential fatty acids, flax seed) *[IIB*]*, studies have shown the Feingold diet and modifying sugar consumption have no effect *[IIIB]*.

Complementary Alternative Medicine. Use is controversial, but common (see Appendix B4).

*** Strength of recommendation:**
I = generally should be performed; II = may be reasonable to perform; III = generally should not be performed.
Level of evidence supporting a diagnostic method or an intervention: A=randomized controlled trials; B=controlled trials, no randomization; C=observational trials; D=opinion of expert panel.

Table 1. DSM-IV-TR Diagnostic Criteria for ADHD

A. Either 1 or 2

1) Six (or more) of the following symptoms of **inattention** have persisted for at least 6 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 often easily distracted by extraneous stimuli
i) Is often forgetful in daily activities

2) Six (or more) of the following symptoms of **hyperactivity-impulsivity** have persisted for at least 6 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

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

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before 7 years of age.

C. Some impairment from the symptoms is present in 2 or more settings (e.g., at school [or work] or 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).

Code based on type (assuming criteria B–E are also met):

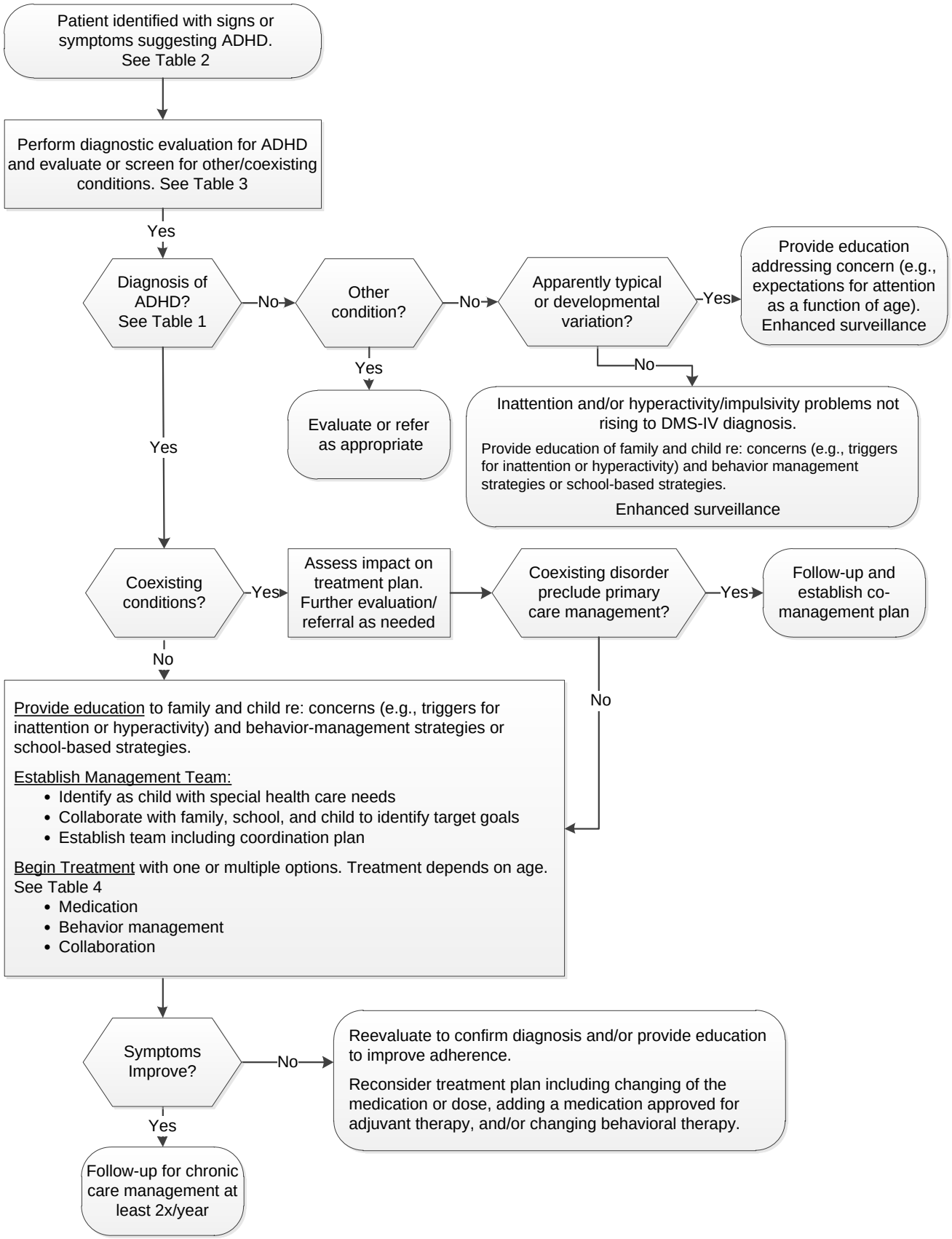
314.01 Attention-Deficit Hyperactivity Disorder, Combined Type: if both criteria A1 and A2 are met for the past 6 months.

314.00 Attention-Deficit Hyperactivity Disorder, Predominantly Inattentive Type: if criterion A1 is met but criterion A2 is not met for the past 6 months.

314.01 Attention-Deficit Hyperactivity Disorder, Predominantly Hyperactive, Impulsive Type: if criterion A2 is met but criterion A1 is not met for the past 6 months.

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

Figure 1. Overview of Diagnosis and Treatment of ADHD in Patients Age 4-18 years *



Note: Adapted from American Academy of Pediatrics, Implementing the key action statements: An algorithm and explanation for process of care for the evaluation, diagnosis, treatment, and monitoring of ADHD in children and adults. Pediatrics, 2011; 128(5): SI 1-SI19

*The overall sequence of evaluation and treatment of adults is similar, see the text details specific to adults.

Table 2. Screen for AD/HD

Screening Questions:
How is your child doing in school?
Are there any concerns about learning?
Are there behavior concerns at home, at school or when playing with others?
Are there problems completing class work or homework?

Consider AD/HD if child presents with:
Can't sit still / hyperactive
Lack of attention / does not listen / daydreaming
Acts without thinking
Behavior problems
Academic underachievement

Table 3. Information Sources for Evaluation for ADHD

Family (parents, guardian, other frequent caregivers):	**School** (and important community informants):	**Child/Adolescent** (as appropriate for child's age and developmental status)
• Chief concerns • History of symptoms (e.g., age of onset and course over time) • Family history • Past medical history • Psychosocial history • Review of systems • Validated ADHD instrument • Evaluation of coexisting conditions • Report of function, both strengths and weaknesses	• Concerns • Validated ADHD instrument • Evaluation of coexisting conditions • Report on how well patients function in academic, work, and social interactions • Academic records (e.g., report cards, standardized testing, psychoeducational evaluations) • Administrative reports (e.g., disciplinary actions)	• Interview, including concerns regarding behavior, family relationships, peers, school • For adolescents: validated self-report instrument of ADHD and coexisting conditions • Report of child's self-identified impression of function, both strengths and weaknesses • Clinician's observations of child's behavior • Physical and neurologic examination

Note: From ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents, American Academy of Pediatrics, Nov. 2011

Table 4. Treatment Options for ADHD

For pre-school aged children, first line is behavior therapy. If not significantly improved, prescribe methylphenidate.

For elementary school aged children and adolescents (≥ 6 years of age), first line is methylphenidate. Pharmacological treatment improves symptoms. Behavioral management techniques help modify behavior.

Medication (ADHD only and past medical or family history of cardiovascular disease considered)
- Initiate treatment
- Titrate to maximum benefit, minimum adverse effects
- Monitor target outcomes

Behavior management (developmental variation, problem or ADHD)
- Identify service or approach
- Monitor target outcomes

Collaborate with school to enhance supports and services (developmental variation, problem, or ADHD)
- Identify changes
- Monitor target outcomes

Note: Adapted from ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents, American Academy of Pediatrics, Nov. 2011

Table 5. First Line Drug Therapy for ADHD

Generic Name Brand Name, Dosage Strength	Onset of Action (min)	Duration of Effect on Behavior (hrs)	Usual Prescribing Schedule Starting dose – Maximum Recommended Dose	30-day Cost[1] Generic	 Brand	Drug Comments
Stimulants: Short-Acting (Immediate-Release)[2]						
Methylphenidate[3] Ritalin® 5, 10, 20 mg Methylin® 5, 10, 20 mg Methylin™ oral solution 5 mg/5 ml, 10 mg/5 ml	 20 to 30 20 to 30	 3 to 6 3 to 6	5-20 mg BID-TID. Increase dose by 5-10 mg/d weekly, max 60 mg/d.	 $8-19 $8-19	 $45-130 $135-193 $451-644	▪ Take 30 minutes before meals ▪ Methylin® chewable tablets ▪ Sudden death and pre-existing structural cardiac abnormalities or other serious heart problems
Dexmethylphenidate Focalin® 2.5, 5, 10 mg	30	3 to 6	2.5-10 mg BID. Increase dose by 2.5-5 mg/d weekly, max 20 mg/d.	$18-61	$41-85	▪ Take with/after meals ± 30 minutes ▪ Dose is 1/2 that of short-acting MPH (on a mg-to-mg basis)
Mixed Amphetamine Salts Adderall® 5, 7.5, 10, 12.5, 15, 20, 30 mg	30	5 to 7	5-15 mg BID or 5-10 mg TID. (For patients 3 to 5 years old, begin with 2.5 mg daily). Increase dose by 2.5 mg/d (3 to 5 y/o) or 5 mg/d (6 to 12 y/o) weekly, max 40 mg/d.	$85	$249	▪ Take with/after meals ± 30 minutes
Dextroamphetamine Dexedrine® 5, 10 mg ProCentra 5mg/ml oral solution	20 to 60	4 to 6	5-15 mg BID or 5-10 mg TID. (For patients 3 to 5 years old, begin with 2.5 mg daily). Increase dose by 2.5 mg/d (3 to 5 y/o) or 5 mg/d (6 to 12 y/o) weekly, max 40 mg/d.	$14-27 NA	$306-612 $480 per 16 oz	▪ Take with/after meals ± 30 minutes
Stimulants: Intermediate-Acting (Sustained-/Extended-Release)[2]						
Methylphenidate[3] Ritalin-SR® 20 mg Metadate® ER 20 mg	 60 to 90 60 to 180	 3 to 8 (highly variable)	20-40 mg daily or 40 mg in am, and 20 mg in early afternoon. Increase dose by 20 mg/d weekly, max 60 mg/d.	$45-128	$72-215 $49-145	▪ Take with/after meals ± 30 minutes ▪ Supplementation with short-acting MPH may still be necessary ▪ Do not crush/chew/divide
Dextroamphetamine Dexedrine Spansules® 5, 10, 15 mg	60 to 90	6 to 10 (highly variable)	5-30 mg daily or 5-15 mg BID. (For patients 3-5 years old, begin with 2.5 mg daily). Increase dose by 2.5 mg/d (3-5 years old) or 5 mg/d (6-12 years old) weekly, max 40 mg/d	NA	$62-249	▪ Take with/after meals ± 30 minutes ▪ Drug release is variable-supplementation with short-acting dextroamphetamine may still be necessary ▪ Capsule contents may be sprinkled on food

(Continued on next page)

Table 5. First Line Drug Therapy for ADHD, continued

Generic Name Brand Name, Dosage Strength	Onset of Action (min)	Duration of Effect on Behavior (hrs)	Usual Prescribing Schedule Starting dose – Maximum Recommended Dose	30-day Cost[1] Generic	 Brand	Drug Comments
Stimulants: Long-Acting (Once-Daily)[2]						
Methylphenidate[3] Ritalin® LA, 10, 20, 30, 40 mg	1.8 hrs	7 to 9	20-60 mg. Increase dose by 10 mg/d weekly, max 60 mg/d.	$125	$148-303	▪ Take with/after meals ± 30 minutes ▪ Do not crush/chew/divide ▪ Capsule contents may be sprinkled on applesauce[4]
Metadate® CD 10, 20, 30 mg	90	7 to 9	20-60 mg daily. Increase dose by 20 mg/d weekly, max 60 mg/d.	Generic not available	$155-260	▪ Do not crush/chew/divide ▪ Capsule contents may be sprinkled on food
Concerta®[5] 18, 27, 36, 54 mg	30 to 60	8 to 12	18-72 mg daily. Increase dose by 18 mg/d at weekly intervals, max 54 mg/d.	$158-181	$195-411	▪ Do not crush/chew/divide ▪ Tablet shell may appear in stool
Daytrana® 10, 15, 20, 30 mg patch	3 hours	10-12	10 mg applied to hip area, titrate upwards weekly	Generic not available	$191	▪ Remove patch after 9 hours ▪ Anorexia, insomnia, tics more common ▪ Use if cannot take oral meds
Quillivant XR® 25mg/5ml (5mg/ml)	4 hours	12	20 mg once daily in the morning, titrate up weekly in increments of 10 mg to 20 mg, max 60mg	Generic not available	$210	▪ For ages 6 and above ▪ Once-daily liquid ▪ Abuse and dependence warnings ▪ Avoid use in patients with known structural cardiac abnormalities
Dexmethylphenidate Focalin XR® 5, 10, 15, 20, 30, 40 mg caps	30	12	5-40 mg, increase dose by 5 mg weekly	Generic not available	$178-205	▪ Do not take with antacids ▪ Can be sprinkled on applesauce but not crushed, chewed
Lisdexamfetamine Vyvanse® 20, 30, 40, 50, 60, 70 mg caps	2 hours	10	30 mg, increase by 20 mg weekly to 70 mg max	Generic not available	$169	▪ Capsule can be opened and contents dissolved in water
Mixed Amphetamine Salts Adderall XR® 5, 10, 15, 20, 25, 30 mg	30	8 (approx)	10-30 mg daily. Increase dose by 5-10 mg/d weekly, max 30 mg/d.	$50	$231	▪ Take with/after meals ± 30 minutes ▪ Capsule contents may be sprinkled on applesauce[4]

Table 5. First Line Drug Therapy for ADHD, continued

Generic Name Brand Name, Dosage Strength	Onset of Action (min)	Duration of Effect on Behavior (hrs)	Usual Prescribing Schedule Starting dose – Maximum Recommended Dose		30-day Cost[1] Generic	 Brand	Drug Comments
Non-Stimulants							
Atomoxetine (Strattera®)[3] 10, 18, 25, 40, 60, 80, 100 mg	Slow onset	~ 24	≤70 kg 0.5 mg/kg/day; increase after a minimum of 3 days to 1.2 mg/kg/d, max 1.4 mg/kg/d or 100 mg, whichever is less	>70 kg 40 mg/day; increase after a minimum of 3 days to 80 mg/day, max 100 mg/d.	Generic not available	$186-217	▪ When transitioning from stimulants to atomoxetine, cross-taper (i.e., decrease stimulant gradually while increasing dose of atomoxetine) ▪ Dosage adjustments are required for patients concurrently taking CYP2D6 inhibitors and those with hepatic insufficiency [6] ▪ 1.6 to 1.8 mg/kg/d may be warranted in some pts. ▪ Not recommended for children <6 years old.

Note: Consider referral to child psychiatry for use in children <5 years old

[1] For brand drugs, Average Wholesale Price minus 10%. AWP from Amerisource Bergen Wholesale Catalog7/20/2012 and Red Book Online 7/20/2012. For generic drugs, Maximum Allowable Cost plus $3 from BCBS of Michigan MAC List, 7/16/2012.

[2] Stimulants are not recommended for children < 3 years old

[3] May in rare instances cause prolonged and sometimes painful erections known as priapism. Healthcare professionals should talk to male patients and their caregivers to make sure they know the signs and symptoms of priapism and stress the need for immediate medical treatment should it occur. Younger males, especially those who have not yet reached puberty, may not recognize the problem or may be embarrassed to tell anyone if it occurs.

[4] The applesauce should not be warm; mixture of drug and applesauce should be consumed immediately, and should not be stored for future use.

[5] For the brand drug Concerta, in November 2014 the FDA removed the AB-rating of therapeutic equivalence for generics made by manufacturers Mallinckrodt, AvKARE, and Kremers Urban. Pharmacies can not automatically substitute a generic equivalent for Concerta. By May 2015 these generics will either be confirmed to be bioequivelant to Concerta or they will be voluntarily withdrawn from the market.

[6] For patients concurrently taking CYP2D6 inhibitors (e.g., fluoxetine, citalopram, sertraline, paroxetine, bupropion) the dose should be increased only if symptoms fail to improve after 4 weeks and the initial dose is well-tolerated; for patients with moderate hepatic insufficiency (Child-Pugh Class B), initial and target doses should be reduced to 50% of the normal dose; for patients with severe hepatic insufficiency (Child-Pugh Class C), initial dose and target doses should be reduced to 25% of the normal dose.

Table 6. Precautions for Stimulants and Non-Stimulants Used in Treatment of ADHD

Generic Name [Brand Name]	Drug Class Side Effects/Monitoring Parameters
Stimulants	
All stimulants	▪ Cardiovascular risk: Prior to prescribing stimulants all patients should be screened for syncope with exercise, history of structural/congenital heart defects and a family history of sudden unexpected cardiovascular death. Patients with a positive screen to one of these 3 questions should be considered for further evaluation, such as an EKG, prior to beginning stimulant therapy. ▪ Anorexia, insomnia, abdominal pain/stomach upset, headaches, irritability, rebound, flattened affect, social withdrawal, weepiness, mood lability, tics, tremor, weight loss, reduced growth velocity. ▪ Monitor height, weight, blood pressure, and pulse ▪ Avoid decongestants ▪ Rare: visual hallucinations, seizures.
Methylphenidate	Rare: may cause prolonged and sometimes painful erections (priapism).
Non-Stimulants	
Atomoxetine [Strattera®]	▪ Liver injury. Discontinue in patients with elevated liver enzymes. ▪ Abdominal pain, decrease in appetite, vomiting, headaches, insomnia, somnolence, dizziness, irritability, increase in heart rate and blood pressure ▪ Monitor blood pressure and pulse ▪ Dosage adjustments are necessary for patients taking CYP450 2D6 inhibitors and poor metabolizers (PMs) of CYP2D6. (PMs can be identified by testing.) Increase in suicidal ideation (↑0.4% FDA review of children and adolescents 9.05). Rare: may prolonged and sometimes painful erections (priapism).

[1] Theoretical potential for GI obstruction with Concerta® (tablet is non-deformable); do not use in patients with severe GI narrowing.

Table 7. Second Line Drugs for Treatment of ADHD

(Adapted from Miller KJ, Castellanos FX. Attention deficit / hyperactivity disorders. Pediatrics in Review; 1998, 19(11):373-384)

Medication	Indications	Dose Schedule	Range	Cost*	Drug Class Side effects / Comments
		Antidepressants			
Bupropion Wellbutrin ® 75, 100 mg Wellbutrin SR ® 100, 150 mg (twice-daily formulation) Wellbutrin XL® 150, 300 mg (once-daily formulation)	ADHD with intolerance to stimulants (esp. due to decreased appetite) ADHD with depression, aggression, irritability Smoking cessation In consultation with a child psychiatrist, may be used for: Mood lability Aggression, Depression	<u>Children 8-12 years</u>: Initial: 75mg/day Increase: every 1-2 weeks: 75-100mg/d, then 75 mg BID, then 75+100mg daily, then 100mg BID, then 75+150mg daily or for children >20kg: 1 mg/kg/d, then 3 mg/kg/d at week 1, then 6 mg/kg/d or 300 mg (whichever is less) at week 3 <u>Adolescents:</u> Initial (immediate-release): 100 mg BID Initial (sustained-release): 1.5 – 2 mg/kg/d or 100 – 150 mg in morning Increase: 50-100 mg or 0.5 mg/kg to 1 mg/kg every 1 to 2 weeks <u>Frequency</u> (children and adolescents) IR: usually BID, sometimes TID SR: BID. May begin with once daily and titrate to BID XL: daily. Begin with IR or SR, change to XL after determining optimal dose Must be taken daily	75 to 300 mg/d	$17-20 generic $72-287 brand $16-49 generic $118-238 brand NA generic $236-328 brand	▪ Black Box Warning: Risks for changes in behavior, hostility, agitation, depressed mood, suicidal ideation, and attempted and completed suicide. ▪ Agitation, dry mouth, insomnia, headaches, nausea, constipation, tremor ▪ Lowers seizure threshold ▪ Contraindicated in patients who have Bulimia or anorexia Nervosa ▪ Avoid bedtime administration ▪ May be used in combination with stimulants for poorly responsive cases ▪ SR tablets may be split, but not crushed/chewed; tablets should be used soon after spitting to avoid chemical degradation ▪ Taper over 1 to 2 weeks ▪ Efficacy of XR product has not been evaluated in ADHD ▪ Take care not to give >150mg within an 8 hour interval. Patients should be advised not to double doses if they miss a dose. ▪ Consider referral to child psychiatry for use in children <8 years old

Table 7. Second Line Drugs for Treatment of ADHD, continued

Medication	Indications	Dose Schedule	Range	Cost*	Drug Class Side effects / Comments
Antidepressants (continued)					
Antihypertensives					
Clonidine Catapres ® or generic 0.1, 0.2, 0.3 mg tablets Available as a patch Kapvay (extended release)	ADHD + tics ADHD + Post traumatic stress disorder (PTSD) PTSD Insomnia, Oppositionality Hyperarousal, Aggression	Initial: 0.05 mg HS Increase: 0.05 mg every 3 to 7 days Frequency: 3 to 4 doses/day for ADHD , but may be given just at HS for PTSD, insomnia Must be taken daily, caution parents not to give prn if using for insomnia Maximum effect may take several weeks Start and stop slowly Initial: 0.1 mg HS increase in 0.1 mg increments every 7 days Frequency: 2 doses per day for ADHD (either split equally or with the higher split dosage given at bedtime); maximum: 0.4 mg/day	0.05-0.2 mg/d	$5-13 generic $75-200 brand $186 brand	▪ Sedation (50%), dizziness, anorexia, orthostatic hypotension, depression, nightmares, enuresis ▪ Sedation tends to decrease over time ▪ Rebound hypertension and/or rebound insomnia if stopped abruptly ▪ Monitor blood pressure: baseline, after dose adjustment, and at follow up. ▪ Baseline EKG advisable ▪ 4 cases of sudden death have been reported with combination treatment of Clonidine + methylphenidate ▪ Taper over at least 1-2 weeks to discontinue ▪ Consider referral to child psychiatry for use in children <5 years old
Guanfacine Tenex ® or generic 1,2 mg tablets (limited data available) Intuniv (long acting) 1,2,3,4 mg	ADHD + tics ADHD + PTSD PTSD Insomnia, Oppositionality Hyperarousal, Aggression	Initial: 0.5 mg HS Increase: 0.5 mg/week Give as one to two doses/day Takes several days to weeks to take effect Initial 1mg in AM, increase by 1 mg/wk, max 4 mg/d	0.5 to 3 mg/d 1-4 mg/day	$7-16 generic $78-230 brand	▪ Sedation, dizziness, nausea, orthostatic hypotension, insomnia, agitation, headaches, stomach aches, enuresis ▪ Monitor blood pressure ▪ Baseline EKG is advisable ▪ Consider referral to child psychiatry for use in children <5 yrs old Somnolence is common Recommended dose may be too low for adolescents

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Table 7. Second Line Drugs for Treatment of ADHD, continued

Medication	Indications	Dose Schedule	Range	Cost*	Drug Class Side effects / Comments
Drugs Sometimes Used to Augment Treatment of ADHD (e.g., Antipsychotic Medications, Trazodone)					
Risperidone Risperdal ® or generic 0.25, 0.5, 1, 2, 3, 4 mg tablets Available as orally disintegrating tablets (Risperdal M-tab - no generic) in 0.5, 1, and 2 mg Available as a liquid 1 mg/cc	ADHD + tics ADHD + aggression ADHD + mood swings ADHD + severe insomnia, aggression, and/or hyperactivity	Initial: 0.5 mg HS (0.25 if < 20 kg) Increase: 0.5 mg BID after 3 to 7 days and then by 0.5 mg/day up to 1 mg BID Frequency: 1 - 2 doses/day for aggression/severe mood swings, but may be given just at HS. Must be taken daily. Maximum effect may take 1 -2 weeks Start and stop slowly	0.5 to 2 mg/d	$30-38 generic $219-330 brand	▪ Sedation, orthostatic hypotension, orthostatic tachycardia, dizziness, increased appetite, metabolic syndrome (hyperglycemia, insulin resistance, hypercholesterolemia, hypertriglyceridemia), akathesia, dystonic reaction, tardive dyskinesia, extrapyramidal symptoms, neuroleptic malignant syndrome, hyperprolactinemia, ▪ Sedation tends to decrease over time ▪ Monitor weight, glucose, cholesterol, triglycerides, and liver function studies at least yearly. ▪ Baseline liver function panel advisable ▪ Consider referral to child psychiatry, especially if more than 1-2 months treatment is required, and/or in children < 5 yrs old. ▪ Fluoxetine, paroxetine (other CYP2D6 inhibitors) may increase serum levels of risperidone ▪ QT prolongation has been reported
Trazodone generic 50, 100 mg tablets	ADHD + insomnia ADHD + Hyperactivity and/or Aggression	Initial: 25 mg q HS Increase: 25 mg/week up to 200 mg per day. Give as single dose or as divided doses up to three doses/day Takes several days to weeks to take effect	25 to 200 mg/d	$4-6 generic	▪ Sedation, dizziness, orthostatic hypotension. ▪ Monitor blood pressure and heart rate: baseline, after dose adjustment, and at follow-up. ▪ Consider referral to child psychiatry for use in children <5 yrs old. ▪ Fluoxetine, sertraline (other CYP3A4 inhibitors) may increase serum levels of trazodone

For brand drugs, Average Wholesale Price minus 10%. AWP from Amerisource Bergen Wholesale Catalog7/20/2012 and Red Book Online 7/20/2012. For generic drugs, Maximum Allowable Cost plus $3 from BCBS of Michigan MAC List, 7/16/2012

Table 8. Types of Intervention for ADHD

Pharmacotherapy	See above.
Psychoeducation and Support	Have printed materials handy to distribute to patients, families, and schools regarding diagnosis, medications, and treatment/support services. Be prepared to present this information to schools and community agencies. (See internet sources for handouts in text section on "Behavioral management.")
Parent Skills Training	Such training may occur in formal groups and classes, through reading books and through individual counseling.
Family Therapy	This may be particularly useful for families with very disruptive children, families with adults who suffer from ADHD and/or complicated psychosocial circumstances.
ADHD Support Groups	These groups may be available in your local area through CHADD (Children and Adults with Attention Deficit Disorder) or other local organizations identified by community mental health or your local Intermediate School District (ISD). Support groups allow parents to connect and share with other parents who have similar concerns about their children. Often, ADHD support groups sponsor lectures and reading materials along with the group meetings.
Advocacy Groups	These groups help parents learn about the legal rights their children have with regard to educational settings and special education services. One such group is PACER (Parent Advocacy for Children's Educational Rights).
Social Skills Training	This training often uses role-play, modeling and group feedback to teach children practical interpersonal skills in a safe-setting. Such skills include: maintaining eye contact, strategies for initiating and maintaining conversations, remembering to share and cooperate, how to read facial expressions and judge an appropriate response, etc.
Cognitive Behavioral Therapy	This work often focuses on becoming more reflective, learning to stop and think before acting or speaking and learning to improve problem solving skills.
School Consultations/ Interventions	This includes composing letters with diagnoses, medications, and recommendation; obtaining baseline and follow-up information about school performance and response to treatment, attendance at IEP meetings, etc.
Alternative/Complementary Treatments	See below.

Clinical Background

Clinical Problem and Current Dilemma

Prevalence and Impact

Attention deficit hyperactivity disorder (ADHD) is the most commonly diagnosed behavioral disorder of childhood. Birth-cohort based surveys show a prevalence of approximately 7.5%. School and office based surveys are somewhat lower *[C]*. It is more commonly diagnosed among boys. The combined subtype is the most common. Observational studies show some gender differences in subtypes: in girls the inattentive subtype is more common. Symptoms persist into adulthood for 30% to 70% of patients. Current estimates indicate that approx. 3-4 % of adults meet diagnostic criteria for ADHD.

The core symptoms include developmentally inappropriate levels of attention, concentration, activity, distractibility, and impulsivity that persist over a period of at least six months. Children with ADHD usually have functional impairment across multiple settings including home, school, and peer relationships. These children experience long-term adverse effects on academic performance, vocational success, and social-emotional development *[B]*. They experience peer rejection, engage in disruptive behavior and are frustrated learners. They have higher injury rates. Untreated, they have higher rates of motor vehicle accidents, substance abuse, and school drop out *[B]*. These patterns continue for adults with untreated ADHD, including effects on educational attainment and impairment in work performance, social functioning, emotional and marital adjustment, driving record, and financial management.

Some children with ADHD may qualify for special education services under the OHI (otherwise health

impaired) classification or Section 504 of the Rehabilitation Act. All children benefit from teacher awareness and educational support *[D]*.

International statistics are difficult to compare due to varying clinical definitions of the disorder, use of different assessment tools and differing cultural definitions of acceptable childhood behavior. Hyperkinetic disorder (ICD-10) uses a stricter definition than DSM. For children, prevalence rates in studies from Canada (9% for boys, 3.3% for girls), China (3%), Puerto Rico (9.5% - 16.2%), Israel (5%) and Spain (16%), United Kingdom (5%) demonstrate marked variability. Ethnic comparisons in the U.S. demonstrate higher prevalence in African-American children compared to White or Hispanic children. Lower rates are observed in Asian-American children *[C]*.

Primary Care Role

Most patients will present to their primary care provider, generally with concerns about performance at school/work and/or behavioral problems. Depending upon the presentation and potential co-morbidities, the primary care provider may be able to establish the diagnosis, institute appropriate therapy and follow up. Screening questions are useful in identifying potential patients with this disorder. The most common therapy is stimulant medication. These schedule II medications must be prescribed monthly. This is most conveniently done by the primary provider. The provider will need to arrange for consultation in more complex diagnostic or management situations. Lack of insurance coverage is a barrier to specialty care. There are no documented strategies for the prevention of ADHD. Currently there is no cure.

Diagnostic Concerns

Some experts see ADHD as under-diagnosed. The high prevalence of co-morbidities is often confusing. Diagnosis requires more extensive evaluation than is usually possible in a 15-minute office visit. Evaluation of children requires observational information from classroom teacher and parents for children. Evaluation of adults may include information from another person who knows the individual well or parental information and school documentation from childhood is helpful. Currently, ADHD is a behaviorally based diagnosis without clinically useful biologic measurements.

Although there is no diagnostic test for ADHD, the 1998 National Institutes of Health Consensus Statement on ADHD concluded: "there is evidence supporting the validity of the disorder." In their 1998 study published in JAMA, Goldman et al. state "ADHD is one of the best researched disorders in medicine and overall data on its validity are far more compelling than those for most mental disorders and even for many medical conditions."

Treatment Concerns

Concern has been expressed by some that providers are too quick to label patients with ADHD and prescribe medication. There are accepted standards for diagnosis and treatment. Long term use of stimulant therapy in children has not demonstrated any obvious ill effects, through observational data *[C]*. Little formal long term data are available. Delayed growth may be a concern through mid-adolescence but normalizes by late adolescence. This appears to be an effect of the ADHD and not its treatment; however, the MTA study reported decreased growth with continuous stimulant treatment *[A]*. "Drug holidays" can be used, but the benefits of this strategy in mitigating growth delays have not been demonstrated in a controlled setting. Failure to treat could result in sub-optimal learning with long-term adverse developmental and physical outcomes. Drug diversion of stimulant medication is a meaningful problem for which the provider must be alert. Stimulant treatment of the disorder has been associated with decreased substance abuse *[C]*. This is a chronic condition of childhood for which medication therapy has been shown to be the most effective *[A]*.

Rationale for Recommendations

Etiology & Natural History

While the etiology of ADHD is unknown, evidence supports a neurological basis for the disorder. ADHD is characterized by disturbances of executive functioning (e.g., deficits in working memory, inability to plan/organize/integrate). At least three brain regions have been implicated in the disorder. MRI studies have correlated severity of ADHD symptoms with smaller frontal and temporal gray matter, caudate, and cerebellar volumes *[B]*. More than 20 genetic studies support the tendency for inheritability of ADHD. Specifically, genetic studies have shown increased prevalence of ADHD in children of affected persons.

ADHD is a chronic condition that often persists into adulthood. Symptoms tend to improve with age, although this may be due in part to improved coping skills. Synaptogenesis and myelinization continue into adolescence and young adulthood (especially in the frontal lobes), which may also explain improvement of symptoms with age.

Diagnosis

Diagnostic criteria and evaluation. The criteria for ADHD in the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV-TR) were established for children. (See Table 1.) The DSM criteria for ADHD are presently being reworked to make them more applicable to adults. Proposed changes include changing the age of onset of symptoms, rewording the symptoms to encompass

adult domains of functioning and changing the number of symptoms required to make the diagnosis.

An overview of evaluation and diagnosis of children and adolescents is presented in the top half of Figure 1 and in Tables 2 and 3. The overall sequence is similar for adults.

Children and adolescents. Any child 4-18 years old who presents to their primary care provider with inattention, hyperactivity, impulsivity, academic underachievement, or behavior problems (Table 2) should prompt an evaluation for ADHD. The criteria (Table 1) are used to make the diagnosis.

The following information must be obtained from both family and educational settings to derive the diagnosis of ADHD: presence and duration of core symptoms (Table 1); degree of functional impairment; and any associated conditions. The process of evaluation usually requires multiple visits.

Review the social and medical history of the patient's family and, for children and adolescents, the patient's growth and development history.

Perform a complete physical exam to detect alternate diagnoses or comorbidities. Screen for other medical problems. Screen for sensory impairments. Usually the physical exam is normal. The patient's attention span, amount of fidgeting, and (for children) parental interactions can all be observed over several visits. Absence of hyperactivity in the office does not rule out the diagnosis.

For children, standardized rating scales for parent- and teacher-report are strongly recommended. A variety of rating scales are available and some are free of charge; however, many are copyrighted and must be purchased, e.g., Conners Rating Scales (see Appendix A1).

For teenagers, teacher rating scales may be used. However, they are less reliable due to lack of prolonged observation.

Teens with ADHD present a special challenge. During these years, academic and organizational demands increase. Adolescents also face challenges related to normal development: discovering their identity, establishing independence, dealing with peer pressure, exposure to drugs and alcohol, learning to drive, and, emerging sexuality.

No specific diagnostic test (e.g., blood or neurologic) is necessary or sufficient to establish the diagnosis of ADHD. Blood lead levels, thyroid function tests, brain imaging or electroencephalogram have no discriminative ability in establishing the diagnosis of ADHD.

Adults. Most adult patients had ADHD symptoms during childhood, but many were not diagnosed. Adult ADHD patients may have graduated from high school, but are having a difficult time with more demanding activities in adulthood, e.g., studies in college, holding on to a job, or managing other tasks and relationships. Often adult patients become aware of their own symptoms when their child is first diagnosed.

Requesting ADHD medication for "performance enhancement" in college or the workforce does not meet criteria for prescribing medication. Adult patients need to demonstrate that their symptoms are causing them to fail in some aspect of their life.

For adults, only four core symptoms may be necessary in DSM V, rather than six (see Table 1). Adult diagnosis is based upon the condition having been present in childhood/young adulthood, although retrospectively.

Gender differences often exist in psychiatric co-morbidities. Men have a higher incidence of antisocial behaviors and alcohol abuse. Women experience more associated dysthymia, panic disorder, anxiety and phobias than men.

Adults with ADHD may be easily distracted, have difficulty sustaining attention and concentrating, are often impulsive and impatient, and may have mood swings and/or low frustration tolerance. They may be disorganized and have difficulty planning ahead. Although frank hyperactivity is much less common in adults, they may be fidgety and/or feel internally restless. Adults may experience career difficulties. They may lose jobs due to poor performance (lack of attention, poor task completion, disorganization) or interpersonal problems.

A new diagnosis of the condition should be based upon the core symptoms having been present during childhood and persisting. Assessment of areas of functioning that are impacted should include work, daily activities, social relationships, and psychological and physical well-being. Co-morbidities (i.e. substance abuse, depression, hearing impairment, sleep apnea, thyroid disease) are more common and often complicate the diagnosis. Timing of the onset of symptoms is important, i.e. inattentiveness that occurs after onset of depression is less likely to be caused by ADHD. A familial pattern is frequently present. Self-assessment instruments are often used.

For adults, self-report is more likely to be relied upon than rating scales completed by others. A few rating scales are available to help diagnose ADHD in adults (see Appendix A1). While they provide structure in the diagnostic process, there is scant data regarding specificity and sensitivity of these scales in adults. Most are based on DSM IV criteria or are adaptations of scales originally developed for children. Formal neuropsychological testing for adults may be very useful, but is not diagnostic.

Commonly confused and associated conditions. ADHD is a common disorder of childhood. In addition, symptoms of ADHD are non-specific and occur in a wide variety of developmental, psychiatric, and medical disorders. Concerns about under- or over- diagnosis of ADHD may

relate in part to the presence of conditions that are commonly confused with ADHD, e.g., developmental disorders (learning disorders/disabilities, intellectual disability, autistic spectrum disorders), psychiatric disorders (oppositional defiant disorder, anxiety disorders, mood disorders), environmental factors (stress, child neglect/abuse, toxins), and medical disorders (post-traumatic encephalopathy, post-infectious encephalopathy, chronic illness, seizures, sleep disorders, sensory disorders, drug-induced changes. Sleep problems can include sleep disordered breathing/obstructive sleep apnea, restless legs syndrome and periodic limb movement disorder or other medical problem of sleep. In addition, insufficient sleep duration can affect daytime functioning. Specific diagnostic criteria have been developed and published for ADHD (see the Diagnostic and Statistical Manual of Mental Disorders, fourth edition DSM-IV-TR, some relevant definitions are reproduced in Appendix B1); however if an individual displays symptoms atypical for uncomplicated ADHD, or if the individual does not respond to treatment as expected, the primary care physician should strongly consider an alternate diagnosis and/or consultation with an appropriate specialist in ADHD.

ADHD may co-occur with other disorders. According to the MTA study (1999), two-thirds of children with ADHD have at least one other co-morbid disorder. Learning disabilities, depressive disorders, anxiety disorders, sleeping disorders, and tic disorders are more prevalent in patients diagnosed with ADHD. When co-morbid conditions exist, academic and behavioral problems may be more complex and difficult to treat. One reason for (apparent) treatment failure is unrecognized co-morbidity. Conversely, patients with untreated (or inadequately treated) ADHD are at higher risk for psychiatric and behavioral comorbidity. See Appendix B2 for selected psychiatric disorders that may be confused with or co-occur with ADHD and suggestions for distinguishing between disorders.

Treatment

An overview of treatment is presented in the bottom half of Figure 1 and Table 4. The goal of treatment is to improve symptoms and maintain school performance, social interaction, self-worth/self-esteem, and an opportunity for successful learning. Treatment may be considered successful when it improves school/work performance and relationships, decreases struggles, relieves frustration and anger and improves the poor self-image that these individuals may have developed.

Preschool children (age < 6 years) Behavior therapy is the first line of treatment *[A]*. If behavioral interventions do not provide significant improvement and moderate-to-severe functional disturbances continue, methylphenidate may be prescribed. If evidence-based behavioral treatments are not available, clinicians need to weigh the risks of starting medication at an early age against the harm of delaying diagnosis and treatment.

School age children, adolescents, and adults (age ≥ 6 years). A treatment plan for ADHD should include both pharmacologic and behavioral components. Pharmacologic treatment improves core symptoms *[A]*. Behavioral management techniques can address and modify behavior, which is helpful for all children, particularly those with challenging behavior in circumstances such as:

- During periods poorly covered by medications (stimulants – later in the day)
- Those requiring lower doses due to side effects
- The 5%-20% of patients who do not respond to medication approaches.

Pharmacologic treatment. The treating physician must decide the strategy of pharmacologic treatment based on the circumstances of the individual patient with input from the family and patient (if possible), keeping in mind the patient's activities and goals. Typically, the first line agents are stimulants (methylphenidate, dextroamphetamines, and mixed amphetamine salts). Atomoxetine, guanfacine, and clonidine are non-stimulant medications approved by the FDA for treatment of ADHD. Other non-stimulant medications used for ADHD are some antidepressants (buproprion, trazodone) and occasionally atypical antipsychotics (e.g., risperidone, aripiprazole) or mood stabilizers (e.g., carbamazepine). These are not approved by the FDA for treatment of ADHD, but controlled studies have shown them to be useful when stimulants are ineffective or comorbidities are present; therefore, they may be appropriately prescribed "off label". Tables 5-7 provide an overview of dosing, cost, side effects and other information for first line and second line agents, respectively.

Stimulants are the best researched *[A]*, safest and the most effective medication for this purpose. Stimulants improve the core symptoms of inattention, impulsivity and hyperactivity. They also improve the individual's ability to follow rules, decrease emotional over-reactivity and improve relationship with peers and family members, thereby improving self-control, social interactions and self-esteem. The short-term benefits are obvious; but long-term outcomes in educational and occupational achievement and behavior have not been demonstrated. Studies have shown that stimulants do not change underlying cognitive ability, although academic performance may improve. Decreased risk of substance abuse has been seen in patients with ADHD who are treated with stimulants versus those not treated with stimulants.

Stimulants are categorized as Schedule II controlled substances because they have the potential for abuse and dependence. Multiple studies have shown that children taking stimulants to treat ADHD do not develop dependence or signs of addiction *[B]*. Multiple studies also suggest that children taking stimulants to treat their ADHD actually reduce their risk for addiction to illicit drugs. These medications do carry a black box warning about abuse potential.

The mechanism of action of stimulants is not fully known, but is predominantly attributed to binding of the dopamine transporter and subsequent inhibition of dopamine reuptake resulting in increased levels of extracellular dopamine.

Two major categories of stimulants are available for the treatment of ADHD: methylphenidate and amphetamine salts (and their isomers and pro-drugs). Both medications are available in various formulations (see Table 5).

Mixed amphetamine salts (Adderall), dextroamphetamine (Dexedrine), and lisdexamfetamine (Vyvanse) have demonstrated equivalent efficacy to methylphenidate (MPH). MPH and mixed amphetamine salts are both considered first-line agents. The decision regarding which agent a clinician first prescribes should be made on the basis of individual preferences of the clinician and the family.

Both types of stimulants are available in several short-, intermediate-, and long-acting formulations. There is a wide variation in individual responses. Unlike many medications, the dosage of stimulants is less weight dependent. Suboptimal doses of stimulant medication may result in inconsistent or incomplete coverage through the day and inadequate control of symptoms. Management of these medications is complex and failures are often due to improper doses rather than the ineffectiveness of the medication.

Treatment is generally initiated with a long-acting preparation of methylphenidate. The patient should be informed that some long-acting preparations have to be swallowed whole. Time of onset of action for the long-acting medications is usually 30 minutes with duration of action varies by product.

Ritalin® LA, and Metadate® CD have a bead delivery system. A proportion of the beads are released initially to provide immediate coverage and a second quota is released approximately four hours later. Concerta® has 3 layers. The central core which is surrounded by a semi-permeable membrane which is then surrounded by an immediate release coating. When the tablet reaches the GI tract, the outer layer dissolves providing the initial dose of MPH. Water then permeates through the semi-permeable membrane (which is the second layer) into the central core of the tablet and helps with release of the rest of the drug.

Daytrana® is a transdermal delivery system applied to the hip area for 9 hours. It can cause skin irritation and sensitization to methylphenidate. It is useful for those who cannot take oral medication or need early removal of the patch due to insomnia.

The intermediate-acting forms of MPH (Ritalin-SR®, Methylin® ER, Metadate® ER) are formulated in a wax matrix core, which may result in unpredictable release of active MPH. Therefore, the durations of action of these formulations are highly variable. This often necessitates supplementation with a short-acting (immediate-release) product for a consistent effect throughout the day. All three formulations are considered therapeutically interchangeable.

Supplementation with a single small dose of a short-acting (immediate-release) product may still be prescribed, even with these long-acting products, either in the morning (Concerta®) or in the evening (Ritalin® LA, Metadate® CD), depending on the choice of long-acting formulation.

Mixed amphetamine salts are the second choice for therapy. Adderall® XR has a bead delivery system with a proportion released initially and the rest about four hours later. It has fewer adrenergic side effects than methylphenidate. The Dexedrine spansule® delivers the initial dose immediately and the remaining medication is released slowly over time so that the therapeutic levels last from 6 to 8 hours.

Lisdexamfetamine (Vyvanse®) is a pro-drug which releases the dextroamphetamine by hydrolysis after ingestion. Its theoretical advantage is less potential for abuse or overdose toxicity.

Starting stimulant therapy. Target goals have to be defined for each individual accounting for their age (during childhood), school or work environments, home environment, educational and athletic expectations, and specific after school or work activities. Cultural factors that affect the patient's health care also need to be considered. Goals should be realistic and achievable.

Since dose is not weight dependent, start with the lowest dose. Generally the relationship between dose and response levels is linear. Increase the dose on a weekly interval until the desired change in behavior and academic performance is achieved or the patient develops undesirable side effects.

During the first month of treatment, titration may involve weekly or biweekly follow-up either by visits or by phone calls with a visit by 4 weeks. Patients can be instructed to start with a low dose and then to increase the dose after one week if no side effects have been observed. They can call into the office to notify you of how the change went. It is not uncommon to make 2-3 changes in one month's time when initiating therapy.

The timing and dose of medication are best determined using feedback from patient as well as their parents and teachers who should be advised to screen for side effects and the duration of effectiveness of the medication. Short rating scales may be helpful (Appendix A1). After the dose has been established, the patient may be seen for follow-up 2-3 times per year.

Studies have shown that 70–75% of patients respond to the first stimulant medication. This number increases to 90–95% when a second stimulant is tried. If the patient does not respond to or develops side effects with the one

stimulant, try a different stimulant. Side effects are mostly due to adrenergic activity and are dose dependent. Most side effects can be managed by changing the form of the stimulant or adjusting the dose and timing.

Maintaining stimulant therapy. ADHD is a full time disease. A second dose of a short acting medication given in the afternoon or evening may benefit individuals that are having difficulty completing their homework or other work later in the day. This also helps those individuals having difficulties in relationships with peers and family members, as well as improving participation in extracurricular activities. For the majority of patients it is important to continue the medication on weekends and holidays. This gives the parents and family members an opportunity to observe the effects of the medication.

Several studies have found that adolescents and young adults with ADHD have more traffic violations, motor vehicle accidents and suspended licenses than those without the diagnosis. *Some* studies demonstrate that appropriate treatment of the ADHD with stimulant medication can decrease these risks. Anticipatory guidance should be given to parents with teenagers and to young adults regarding their disease, its treatment, and driving so that extra care can be given to avoid motor vehicle incidents.

Side effects of stimulants. A common side effect of stimulants is appetite suppression, which may result in transient weight loss. Administering the stimulant with or after meals may minimize this side effect. Abdominal pain, headache, irritability and sleep problems may also occur. Difficulty in initiation of sleep may be associated with increased hyperactivity and irritability as the effect of medication wears off. In some children a small dose of a short acting stimulant may help alleviate this symptom. In others addition of a second line agent may become necessary to overcome sleep difficulties. Depression is uncommon but may appear after several months of treatment. The patient may develop sadness, apathy, and loss of interest in activities and suicidal tendencies. Symptoms disappear after discontinuing the medication.

Before starting the medication it is important to obtain a history of the patient's eating and sleeping patterns, family history of tics and Tourettes disorder, and assess any signs of depression and social withdrawal. Tics may appear in some patients when they are on stimulant medication, and disappear with discontinuation of medication. Presence of tics is not a contraindication for taking stimulants. The decision to stop or modify stimulant dose needs to be individualized.

Rare patients may appear to develop Tourettes disorder when on stimulants; in actuality 50% of the patients with Tourettes Disorder also have ADHD which may present 2 to 3 years before the tics appear. It is believed that stimulants do not cause Tourettes, which is an inherited disorder, it simply unmasks the condition. This usually occurs in elementary school age or adolescence.

Controversies about suppression of growth in patients on stimulants have still not been resolved. Analysis of the MTA study after 3 years revealed some growth suppression in patients on continuous medication compared to a smaller growth suppression in patients not on continuous medication. However, a modest reduction in height and weight initially might attenuate over time, leading to no change in predicted adult height. Elevated heart rate and blood pressure have been observed in children undergoing therapy with stimulants. These effects are generally considered clinically insignificant and dose related.

Concerns have been raised about the risk of sudden cardiac death in patients on stimulants. The AAP in collaboration with the AHA put out a statement regarding careful screening of pediatric patients for family history of sudden cardiac death, hypertrophic cardiomyopathy or long QT syndrome or a personal history of heart disease, palpitations, syncope, or seizures *[B]*. The screening evaluation should include a thorough cardiovascular examination. An EKG is not mandatory but should be left to the discretion of the treating physician *[D]*. Two recent reviews demonstrate no evidence that using stimulants increases serious cardiovascular risk.

Methylphenidate products, may in rare instances cause prolonged and sometimes painful erections known as priapism. If not treated right away, priapism can lead to permanent damage to the penis. Priapism can occur in males of any age and happens when blood in the penis becomes trapped, leading to an abnormally long-lasting and sometimes painful erection.

Strattera (atomoxetine), has also been associated with priapism in children, teens, and adults. Priapism appears to be more common in patients taking atomoxetine than in those taking methylphenidate products.

Long-term management of stimulants. Visits should occur on a monthly basis until optimal response is consistent. Subsequently during the first year of treatment visits should occur every three months. Then visits should occur at least two times per year until stable long term, then periodically as determined appropriate.

Laboratory tests are not necessary except for patients on multiple psychotropic medications e.g., LFTs for depakote, glucose for risperdal. At each visit, the physician should check height, weight, heart rate, blood pressure, the dosage and timing of medications. The physician should talk to older children alone to obtain more reliable report from their point of view to address relationship issues (problems with peers and/or family), and to screen for co-morbid problems (e.g., depression, substance abuse, sexual activity). Duration of treatment is individualized. Ambivalence about medication is common and can cause poor compliance even when benefits are obvious. The medication is often discontinued without consulting the

physician. To prevent this, trial periods off medication should be discussed. Off medication trials should not be given at the beginning of the school year or when there are other changes imminent e.g., change in school or job, divorce or remarriage. Termination of medication can be planned if missed dosages do not result in behavior problems. If symptoms do not recur, the patient can remain off the medication.

Misuse of stimulants. "Misuse" is using the medication without a prescription. This does not imply abuse. Stimulants are misused by 5-35% of college-age individuals. Many of these individuals are likely using these medications for the purpose of increasing their concentration and attentiveness rather than for "getting high." Studies report 16% or more children with ADHD have been asked by a peer to trade, sell or give them their stimulant medication. This increases to 23% with college students.

Explain to adolescents and young adults that they will likely be asked to share their medication with a friend or acquaintance. Note that sharing or "dealing" their medications is a felony. Role play or discussing strategies to deal with this situation may be helpful.

Stimulants are controlled substances. Patients suspected of trading/selling them or abusing them should undergo the same monitoring procedures used for more frequently abused prescription drugs. Procedures are detailed in the UMHS clinical guideline "Managing Chronic Non-Terminal Pain in Adults, Including Prescribing Controlled Substances." Some key aspects are summarized below.

- Watch for drug seeking behaviors. Watch for patterns of early refills, multiple contacts about stimulants, multiple sources of stimulants, young adults not previously diagnosed who are seeking stimulants. People seeking to abuse these medications are more likely to request short-acting Ritalin or Adderall as it is difficult to abuse the long acting preparations.

- Pill counts. Schedule follow-up visits earlier than when refills are due to check that medication use over time matches prescribing.

- Check actual use with urine testing. If diversion is suspected, check for presence/absence of stimulants in urine by ordering gas chromatography/mass spectroscopy testing (GCMS, at UMHS "Drug6" for charge of $136).

- Check for other prescriptions for stimulants. Search local state prescription monitoring programs (e.g., MAPS in Michigan, https://sso.state.mi.us) for stimulant and other controlled substance prescriptions.

- Establish and enforce conditions for continued prescribing. Discuss conditions that patients must meet in order to continue prescribing stimulants and formalize them in a "Controlled Substance Treatment Agreement."

Atomoxetine (Strattera®). Atomoxetine is a non-stimulant drug approved by the FDA for treatment of ADHD. Studies with placebo have shown that the efficacy of atomoxetine is comparable to that of stimulants. Atomoxetine is believed to work by increasing the norepinephrine levels by inhibiting norepinephrine reuptake at neuronal synapses.

Atomoxetine can be given once a day and works for 24 hours. A single dose administered in the morning will carry over to the next morning and will improve the morning symptoms, e.g., excessive arguing and not being able to get out of bed to be on time for school. The maximum dosage is typically 1.4 mg/kg/day; rarely some children may need to go up to 1.6 to 1.8 mg /kg/day.

A disadvantage of atomoxetine is that in some cases the patient has to be on the medication for 4 to 6 weeks to reach the full therapeutic effect. Some physicians may want to use a short acting stimulant for initial management, followed by changing over to atomoxetine while cross tapering the stimulant medication. Atomoxetine does produce desired behavior changes, but does not help with focusing. It is particularly useful for patients with comorbid disorders, especially anxiety or the potential for substance abuse.

The FDA recommends that children and adolescents being treated with atomoxetine be closely monitored for clinical worsening, such as agitation, irritability, suicidal thinking or behaviors, and unusual changes in behavior, especially during the initial few months of therapy or when the dose is changed. A black box warning regarding suicidal ideation was added in 2005. Nausea can be a significant problem if dose is increased too rapidly. These side effects can be avoided by giving the medication in the evening or by twice a day dosing. Other adverse effects can include sleepiness and liver damage, which is reversible with medication discontinuation. LFT's should be obtained at the first symptom/sign of liver dysfunction. Atomoxetine should be discontinued in patients with clinical (e.g., jaundice, RUQ tenderness) or laboratory evidence of liver injury, and should not be restarted.

Antihypertensives. The alpha-2 adrenergic agonists, clonidine (Catapres®) and guanfacine (Tenex®, Intuniv®) are also non-stimulants approved by the FDA for treatment of ADHD. They may be beneficial as alternatives or adjuncts to stimulants, but they have been studied in very few clinical trials as compared to stimulants. Clonidine has been reported to be effective in 50% of patients *[B]*, especially those who are over aroused, easily frustrated, very hyperactive, impulsive, or aggressive. Potential advantages of guanfacine over clonidine include greater selectivity for the alpha-2 receptor, a longer half-life, and fewer sedative and hypotensive effects. Clonidine and guanfacine are not as effective as stimulants in increasing attention. They are especially useful in combination with stimulants for patients who have ADHD related sleep

problems, aggression and excessive hyperactivity. A bedtime dose of clonidine may benefit those children who respond well to stimulant medications but who develop insomnia. These agents are also valuable as monotherapy or in combination with stimulants for children with tics or Tourettes disorder.

Bupropion. Bupropion is an antidepressant with dopaminergic activity similar to stimulants. A few placebo-controlled trials with small numbers of patients (largely, adolescents with comorbid disorders, such as nicotine dependence or substance abuse) demonstrated that buproprion improves hyperactivity and aggressive behavior. Bupropion decreases seizure threshold and should not be prescribed in patients with pre-existing seizure disorder. It should also be avoided in patients with bulimia or anorexia nervosa.

Antipsychotics. Risperidone in combination with stimulants has been shown to be useful in treatment resistant aggression in children with ADHD. Adverse effects include hyperglycemia, weight gain, insomnia and prolactin elevation. Aripiprazole (Abilify®) may be useful with comorbid bipolar disorder.

Behavioral management. Behavioral management should be considered as a part of the treatment plan for ADHD at all ages with a focus on parent education and training and classroom interventions. Psychological interventions (i.e. talk therapy) have not demonstrated efficacy for ADHD symptoms.

The Multimodal Treatment of ADHD (MTA) study of children *[A]* sought to assess the benefit of medication, behavior, and combination treatment. Evolving MTA findings have been inconsistent. Initial results at 24 months demonstrated an advantage for pharmacologic treatments compared with behavioral treatments alone and no significant improvements for the combination of behavioral and medication approaches. (Some experts questioned the analytic approaches used in the MTA at the time.) Subsequent follow-up at 3, 6 and 8 years have not sustained support for one intervention over another.

Parents, teachers and individuals with ADHD need adequate education about the condition to understand the medical basis and how the diagnosis explains much of the behavioral difficulties and needs. This education will help them view behavioral interventions as step-wise approaches to building skills that will help improve function at school, home or on the job. In addition, behavioral interventions facilitate families working together with educators and doctors for long-term treatment success.

Behavioral targets for intervention depend on the individual's age and needs. Parents and teachers of children and adolescents should expect that new intervention and training needs will emerge with increasing age and educational level or demands. Social skills, developing methods for self-monitoring and learning how to keep track of time should be included for all age groups.

In general, interventions should target behaviors one-at-a-time with a positive approach. Limitations of behavioral therapy are that it needs to be continued for long periods and can be costly.

Recommendations for behavioral management are available through the following and other sources:

- CHADD (Children and Adults with Attention Deficit Disorder) Fact Sheets http://www.chadd.org/
- NICHQ ADHD Tool Kit http://www.nichq.org/resources/adhd_toolkit.html
- AAP Parent Pages http://www.healthychildren.org/
- American Academy of Child & Adolescent Psychiatry http://www.aacap.org/cs/ADHD.ResourceCenter
- NIMH: Attention Deficit Hyperactivity Disorder www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml

Many sites provide helpful handouts for parents, teachers, and young adults with ADHD. See Appendix A2 for a brief review of tips for home and school for children and young adults.

Behavioral treatment programs include parent training, peer social skills training, family counseling, classroom interventions and intensive peer interventions in recreational settings (see Table 8). Each of these has shown some benefit for children with ADHD *[B]*. Providers of such training can include mental health professionals, developmental behavioral pediatricians, school personnel and primary care providers. Psychological interventions, including cognitive-behavioral therapy have not been widely thought efficacious for ADHD in children but with potential benefit in adolescents and young adults *[B]*.

Parents and teachers often work with a behavioral consultant or psychologist with the intent of behavioral interventions to shape and reinforce desired behaviors while diminishing undesirable behaviors. Studies suggest that behavioral treatment provides benefit as long as the treatments are maintained. An additional strategy is an educational coach for older children until young adulthood.

Consistency with counseling is important and counseling may need to be increased during adolescence. Adolescents prefer their impulsive behavior and consider alteration of their behavior by medication as a negative. The result is an increase in risk-taking behaviors like alcohol and substance abuse, driving accidents, teen pregnancies and school dropouts.

Patients who are not on medication can be followed up medically one or two times a year especially around critical times in their life, e.g., changes in school.

As with medication choices, it is important to recognize if other conditions are co-morbid with ADHD. Screening for co-morbid conditions is important over time. If co-morbid conditions are found, work with a psychologist, child psychiatrist and/or developmental behavioral pediatrician might be especially helpful.

Two Federal laws, Section 504 of the Rehabilitation Act of 1973 and IDEA safeguard the rights of individuals with disabilities, including ADHD, to a free and appropriate education. Both laws provide an opportunity for accommodations within the school setting if the medical condition is found to be severe enough to affect learning. Parents or individuals with ADHD can request an assessment by the school district but should do so in writing. The extent of the evaluation, accommodations and safeguards vary by law. See Appendix A3 for further information about these laws and Appendix A4 for a list of special education terms.

It is also important to recognize that individuals with ADHD have problems with executive functioning that are not currently recognized under traditional special education rules. Problems with executive functioning include inconsistent performance, poor organizational skills, trouble knowing how to break down tasks and poor sense of time. Such areas should be included as goals in the IEP.

Special Populations

Primary care physicians should consider specialist consultation to assist in the diagnosis and treatment of ADHD in the following populations:

- Preschool age (3 to 5 year)
- Head-injured patients
- Intellectually disabled and/or patients with autistic-spectrum disorders
- Fetal Alcohol Syndrome (FAS) and Alcohol-Related Neurobehavioral Disorder
- Substance-abusing patients
- Older adult patients (31 years +)

Additional information about each of these populations is presented in Appendix B3.

Controversial Areas

Common Myths

Some of the common myths about ADHD are listed below along with explanations regarding them.

ADHD is not a real disorder. The U.S. Surgeon General's Report of 2001 reflects the general consensus that ADHD is a medical disorder with lifelong consequences.

ADHD is a disorder of childhood. Long term studies suggest that 70-80% of children with ADHD have significant symptoms into adolescence and as adults.

ADHD is over-diagnosed. Current prevalence rates likely reflect changes in the last decades: addition of inattentive ADHD criteria to the DSM-IV, changes in special education legislation and improved recognition by providers.

Children with ADHD are over-medicated. A relatively low rate of stimulant use is reported in school age children.

Poor parenting causes ADHD. Evidence from twin studies suggests that genetics accounts for about 80% of the variance for children with ADHD who share the same environment.

Minority children are over-diagnosed with ADHD and are over-medicated. In fact, African American children are unfortunately less likely to receive appropriate access to mental health services and are 2-2.5 times less likely to be medicated for their ADHD.

Girls have lower rates and less severe ADHD than boys. In fact, girls are less likely to be recognized due to lower rates of externalizing behaviors. They have, however, higher rates of internalizing behaviors with more mood and anxiety disorders and problems with social functioning.

Diet and Dyes

Parents should not rely upon dietary changes to the exclusion of other, more effective therapies for ADHD.

The Feingold Diet (Kaiser-Permanente diet) requires children to eliminate all foods containing artificial colors, flavors and salicylates. This eliminates nearly all processed foods. Rigorous dietary studies have failed to duplicate Dr. Feingold's clinical observations. Children with atopic disease may have a higher response rate to diets that eliminate artificial colorings and preservatives.

Short-term open-label trials of other restriction diets have shown benefit. However, these studies suffer from compliance problems.

Increased consumption of refined sugars is postulated as contributing to hyperactivity. Studies have found most behavioral effects of sugar to last from 30 to 90 minutes. Controlled diets in a laboratory setting did not find any differences in the completion of various tasks *[B]*. A prospective observational study correlated more "junk food" in the diet at age 4-1/2 with more hyperactive behaviors that had a modest persistence at age 7 *[C]*. While there is no consistent evidence that removing refined sugar from the diet improves ADHD, encouraging a healthy diet is sensible.

Specifically designed hypoallergenic diets that are individually tailored have demonstrated that food sensitivities or allergies can be involved in provoking behavior problems. The behavioral contribution of food hypersensitivity can be evaluated through an elimination diet of dairy, wheat and citrus. A symptom diary is maintained and foods re-introduced one at a time four weeks later. Compliance with these strict diets is an issue.

Essential omega-6 and omega-3 fatty acids must be obtained from the diet to form long chain fatty acids known as eicosanoids. Recent studies have found children with ADHD to have altered fatty acid metabolism with lower

levels of these essential fatty acids. Increasing essential fatty acids such as omega-3 has been recommended by eating at least a 2 ounce serving of cold water fish three times a week. A double-blind RCT of essential fatty acids supplement vs. placebo found no benefit. Daily flax seed oil (1/2 tablespoon or ground up flax seed (1 tablespoon) is a source of essential fatty acids.

Complimentary / Alternative Medicine (CAM)

Appendix B4 lists common CAM therapies used by families for ADHD and related problems. The use of CAM for ADHD is controversial yet commonly reported by adults and children. Its use may be enhanced by continued debate (in the lay press) about the safety of stimulant medication. Unfortunately, studies suggest that less than 40% of parents of CAM users discuss it with their child's doctor. The primary care provider should be aware of CAM and inquire about CAM use as a primary or secondary therapy.

Regarding some specific CAM therapies:

- Homeopathy – a Cochrane review of homeopathy found this treatment had no significant impact on the severity, core symptoms, or related outcomes for children with ADHD.
- Chamomile or lavender teas or baths have not been studied but are used.
- Supplements vary in purity and potency. St. John's wort, Echinacea, Valerium root, Ginkgo biloba, and pycnogenol are the most commonly tried herbals. Contamination with heavy metals has been reported as well as a 10 – 1000 fold variability in potency by lot. An RCT of St. John's wort demonstrated no benefit. Pycnogenol is considered "possibly ineffective" in the Cochran Database and Natural Products Database.
- Mind-body techniques include diaphragmatic breathing, progressive relaxation, journaling or meditation. They are used as an alternate energy outlet and are thought to help with focus and attention.

Strategy for Literature Search

The literature search for this update began with results of the literature search performed in 2002 to develop the initial guideline released in 2005. The literature search for this update used keywords that were very similar to those used in the previous search. However, instead of beginning the search with literature in 2002, the guideline team accepted the search strategy and results for the search performed through April 2006 for the AACAP Practice Parameter for the Assessment and Treatment of Children and Adolescents with Attention-Deficit/Hyperactivity Disorder.

The search for this update was conducted prospectively using the major keywords of: attention deficit disorder with hyperactivity, humans age 3-30, clinical guidelines, controlled clinical trials, cohort studies, English language, and published 1/1/071/1/10 on Medline. Additional key words for specific searches included: symptoms (academic underachievement, behavior problems, classroom behavior, classroom interventions, degree of functional impairment, evidence of school work, frequent disciplinary events, hyperactivity, impulsivity, inattention, learning patterns, poor concentration, poor task completion, social adjustment), commonly associated/coexisting conditions (learning/language disorder, child abuse, medication side effects, oppositional defiant disorder, conduct disorder, anxiety, depression), commonly confused conditions/differential diagnosis (learning disorder, intellectual disability, mood/anxiety disorder, abuse, developmental delay, static encephalopathy, pervasive development disorder, autism spectrum, absence seizures, sleep disorder, substance abuse) evaluation and testing (vision exam, hearing exam, growth chart, developmental review, neurological exam, chronic physical or mental disorders), rating scales for ADHD, qualitative EEG and functional MRI, other EEG, cognitive behavioral therapy, behavioral interventions (set limits, establish routines, provide positive reinforcement), parental intervention (parenting class, family therapy), alpha-II agonists (clonidine, tenex), antidepressents – welbutrin, effexor, tricyclics (imipramine, nortryptyline, desiprimine), stimulants (adderal, concerta, daytrana, dexedrine, destro-amphetamine, focalin, metadate, methylphenidate, ritalin, vyvanse), modafanil, strattera, transitional and longitudinal care for adults (since 10/1/02), and nutritional supplements and diet (since 10/1/02).

The search was conducted in components each keyed to a specific causal link in a formal problem structure (available upon request). The search was supplemented with very recent clinical trials known to expert members of the panel. Negative trials were specifically sought. The search was a single cycle. Conclusions were based on prospective randomized controlled trials if available, to the exclusion of other data; if randomized controlled trials were not available, observational studies were admitted to consideration. If no such data were available for a given link in the problem formulation, expert opinion was used to estimate effect size.

Related National Guidelines

The UMHS Clinical Guideline on ADHD is consistent with:

American Academy of Child and Adolescent Psychiatry – Practice parameter for the assessment and treatment of children and adolescents with attention-deficit/hyperactivity disorder, 2007

American Academy of Pediatrics – ADHD: Clinical practice guideline for the diagnosis, evaluation, and treatment of Attention-Deficit/Hyperactivity Disorder in children and adolescents, 2011

Measures of Clinical Performance

At this time no major national programs have clinical

performance measures specifically for ADHD diagnosis and treatment, including the Centers for Medicare & Medicaid Services (Clinical Quality Measures for financial incentives for Meaningful Use of certified Electronic Health Record technology, Quality measures for Accountable Care Organizations) and the National Committee for Quality Assurance: (Healthcare Effectiveness Data and Information Set –HEDIS).

Regional programs that have clinical performance measures for treating ADHD include the following.

Blue Cross Blue Shield of Michigan: Physician Group Incentive Program clinical performance measures (PGIP)

Blue Care Network [HMO]: clinical performance measures (BCN)

The measures are summarized below

Follow-up after initiating ADHD medication. Percentage of patients aged 6-12 years (and 13-17 years [PGIP]) with a starting ambulatory prescription dispensed for ADHD medication who had a follow-up visit with a practitioner with prescribing authority during the 30 day initiation phase. (PGIP, BCN)

Follow-up during continuation and maintenance phase. Percentage of patients 6-12 and 13-17 years of age at the time that ambulatory prescription for ADHD medication was started, who remained on the medication for at least 9 months and who, after the 30 day initiation period, had at least two additional follow-up visits in the following 9 months (i.e. months 2-10 following treatment initiation).

Disclosures

The University of Michigan Health System endorses the Guidelines of the Association of American Medical Colleges and the Standards of the Accreditation Council for Continuing Medical Education that the individuals who present educational activities disclose personal financial relationships with commercial companies whose products or services are discussed. No member of the guideline team (Drs. O'Brien, Christner, Bierman, Felt, Harrison, and Kochhar) nor the consultant (Dr. Streetman) has such a relationship.

Review and Endorsement

Drafts of this guideline were reviewed in clinical conferences and by distribution for comment within departments and divisions of the University of Michigan Medical School to which the content is most relevant: Child and Behavioral Health, Family Medicine, General Pediatrics, and Child and Adolescent Psychiatry. The Executive Committee for Clinical Affairs of the University of Michigan Hospitals and Health Centers endorsed the final version.

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2005 John M. O'Brien, MD, Family Medicine, Barbara T. Felt, MD, Behavioral Pediatrics, R. Van Harrison, PhD, Medical Education, Paramjeet K. Kochhar, MD, Pediatrics, Stephanie A. Riolo, MD, MPH, Child and Adolescent Psychiatry. Consultant: Nadine Shehab, PharmD, College of Pharmacy.

Annotated References

(Review old and new references for those to include)

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Supplemental Information: Implementing the key action statements: An algorithm and explanation for process of care for the evaluation, diagnosis, treatment, and monitoring of ADHD in children and adolescents. Pediatrics, 2011; 128(5): SI 1-SI 19 (available at: http://pediatrics.aappublications.org/content/suppl/2011/10/11/peds.2011-2654.DC1/zpe611117822p.pdf)

A review of evidence (1998-2009) and detailed recommendations regarding diagnosis and treatment of ADHD.

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The AMA Council on Scientific Affairs addresses the evidence regarding possible over-prescription or patient misuse of stimulant therapy.

Millichap JG et al The diet factor in Attention-Deficit/Hyperactivity Disorder. Pediatrics, 2012; 129 (2): 330-337

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Reviews the evidence for psychosocial treatments for ADHD and suggests that parent training, classroom management and intensive peer-focused treatments are useful.

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Describes the assessment and treatment of children and adolescents with attention-deficit/hyperactivity disorder based on a systematic review of current evidence and clinical consensus of experts.

Post RE, Kurlansik SL. Diagnosis and management of Attention-Deficit/Hyperactivity Disorder in adults. American Family Physician, 2012; 85(9):890-896.

This article summarizes known information and provides practical recommendations regarding the diagnosis and treatment of ADHD in adults.

Reiff MI (editor). ADHD - A Complete and Authoritative Guide. Elk Grove Village, IL: American Academy of Pediatrics, 2003.

This 354 page paperback book is written for parents of children with ADHD. It uses common scenarios to answer diagnostic, management, and developmental questions. It includes practical suggestions and lists many resources for parents.

Habel L, Cooper WO, Sox CM, et al. ADHD medications and risk of serious cardiovascular events in young and middle-aged adults. JAMA, 2011; 306(24): 2673-2683

Cooper WO, Habel LA Sox CM, et al. ADHD drugs and serious cardiovascular events in children and young adults. NEJM 2011; 365;1896-1904

Schelleman H, Bilker WB, Kimmel SE, et al. Methylphenidate and risk of serious cardiovascular events in adults. American Journal of Psychiatry, 2012; 169(2):178-185

These reviews examine the risk of cardiovascular events in children and adults taking ADHD drugs (particularly stimulants) and found no evidence that these drugs increase cardiovascular risk.

University of Michigan Health System
Guidelines for Clinical Care

Attention-Deficit Hyperactivity Disorder

APPENDICES

Appendix A1. Behavioral Rating Scales

Tool	Psychometrics	Company	Cost	Comments
		Scales for Children and Adolescents		
Conners – 3 **Conners-EC (Early Childhood)**	Good Sensitivity and specificity	Multi-Health Systems, Inc. http://www.mhs.com	Kit $118-193 Forms $27-29/25	On-line (-3 and –EC) or paper forms available (all). Normed by year of age and gender, for 2- -18 years. Available in English, Spanish, French (Canadian). On all scales, behavior is rated from 0 to 3 based on strength of endorsement for a particular behavior. Separate tests are given for parents, teachers, or self report (12-18).
ACTers (ADD-H) Comprehensive Teacher's Rating Scale Parent Teacher Self-report	Good	Hawthorne Educational Systems, Inc. www.hes-inc.com/	Kits $47-51 Forms $32/50	Standardized K-8 grade. Not age normed.
Child Behavior Checklist (CBCL) Parent Report (6-18 years) Teacher Report Form (6-18 years) Preschool Form (1 - 5 years) Youth Self Report (YSR; 11-18 years)	Good Demonstrated reliability and validity. Non-Specific to ADHD, but allows assessment of co-morbid problems. Widely used.	Achenbach System of Empirically Based Assessment 1 South Prospect St. Burlington, VT 05401-3456 www.aseba.org **Phone:** 802-656-2602 **E-mail:** mail@aseba.org	Available in many forms so costs vary; however, will cost ≥ $50.	112 items. Behavior is rated from 0 to 3 based on strength of endorsement for a particular behavior. Available in Spanish. Can be scored with hand- scored profiles and templates or with computer programs. Eight behavioral domains: Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, and Aggressive Behavior. Normative data from large, representative US sample (N=1,753, 6-18 years, 40 states, all race & income). Normed by gender and age (4-11 and 12-18 years).
Vanderbilt Assessment Scale Parent Informant Teacher Informant	Good sensitivity and specificity	Bright Futures – http://www.brightfutures.org/mentalhealth/pdf/professionals/bridges/adhd.pdf	Free	Scales are part of an ADHD Tool Kit developed by the AAP for primary care providers for children. Separate forms for evaluation and follow-up. Not age or gender normed.
ADDES-2 (Attention Deficit Disorders Evaluation Scale Parent (#46) Teacher (#60)	Good sensitivity and specificity	Hawthorne Educational Systems, Inc. www.hes-inc.com/	Kits $220 Forms $33/50	ADDES-2: 4.5-18 y ADDES-S: 11.5-18 y Normed age and gender.
ADDES-S Secondary Age Student Parent (#46) Teacher (#60)	Good sensitivity and specificity	Hawthorne Educational Systems, Inc. www.hes-inc.com/	Kits $220 Forms $33/50	Good for evaluation. Administration 15 minutes. Requires manual to score.

(Continued on next page)

Appendix A1. Behavioral Rating Scales (continued)

Tool	Psychometrics	Company	Cost	Comments
		Scales for Adults		
ASRS (Adult ADHD Self-Report Scale)	Good specificy Moderate sensitivity	http://webdoc.nyumc.org/nyumc/files/psych/attachments/psych_adhd_checklist.pdf	free	Official instrument of World health Organization 18-item questionnaire for patients "at risk" for ADHD Quick 6-item version also available. Available in multiple languages.
Brown Adult ADD Scale	Good sensitivity Low specificity	http://psychcorp.pearsonassessments.com/HAIWEB/Cultures/en-us/Productdetail.htm?Pid=015-8029-240	$70-$400	Asks about clinical history, early schooling, family history, sleep, health, substance use. Requests data from an observer/ significant other. Contains 40 items. Primarily concerned with inattention
Conners Adult ADHD Rating Scales (AARS)	Good sensitivity and specificity	Multi-Health Systems, Inc. http://www.mhs.com	Kit $118-193 Forms $27-29/25	Adult scales for either self-report or observer ratings. Various versions available. Asks about childhood and adult histories. DSM IV criteria plus items about emotional lability.
Wender Utah Rating Scale	Good sensitivity and specificity	www.neurotransmitter.net/Wender_Utah.doc	Free	Measures severity of symptoms in adults with ADHD using Utah criteria. Useful to assess mood lability symptoms.

Note: Standardized rating scales provide useful information and behavioral descriptions but are not diagnostic. Comparison of parent and teacher report using rating scales can reveal discrepancies which may have clinical importance. For example, if a child has more difficulties in a particular caretaker, situation, or environment, this may suggest intervention strategies or may lead to concerns regarding co-morbidity.

Appendix A2. Tips for Individuals with ADHD

General Tips for Parents of Children

- Become educated about ADHD. Resources include your child's doctor and evidence-based websites including:
  - Children and Adults with ADHD (CHADD);
  - American Academy of Pediatrics (AAP);
  - American Academy of Child and Adolescent Psychiatry (AACAP);
  - National Institutes of Mental Health (NIMH).
- Help your child become educated about ADHD at a level appropriate to age and developmental stage in order to promote adherence to treatment recommendations.
- Remember, parents are the best teachers; schedule one-on-one time with your child every day.
- Keep schedules and routines stable day to day; including eating and sleeping.
- Be a model of calm and respectful interactions.
- Ask your child's doctor to summarize the care plan for your child including targeted academic and behavioral goals.
- Discuss behavioral targets with other family members to improve uniform approaches.
  - Use frequent positive reinforcement for appropriate behaviors.
  - Selectively ignore minor negative behaviors.
  - Provide immediate, constructive feedback for the targeted inappropriate behaviors.
  - Monitor frequency of targeted behaviors at baseline and in response to intervention.
- If behavioral areas remain a struggle, seek out parent behavioral training resources.

Younger Children

- Routines are very important
- Balance higher energy and quieter activities through the day.
- Choose your battles – ignore minor misbehaviors
- Give choices but limit the number
- Avoid high-risk situations and times of day. Review the "rules" (hands to self, inside voices) immediately before venturing into a community setting.
- Consider taking "practice trips" that will allow you to implement a consequence (leaving if the rules are not followed) without disturbing your planned and needed shopping trip.

School-age Child at Home

- Invite peers one at a time to reduce stimulation, encourage friendship and allow you to provide feedback. Include homework time as a part of the family routine.
- Organize a non-distracting place for homework.
- Check your child's backpack everyday and help her organize the homework into doable chunks.
- Suggest brief breaks between the 'chunks' of homework.
- Use the activities your child enjoys as incentives for getting work done (homework and chores).
- Help your child use a system (e.g. labeled folders for each subject) to get the homework back to school.
- Many children benefit from work with a tutor or educational coach.
- Be aware of those long-term assignments and discuss a timeline.
- Communicate regularly with your child's teacher about homework, grades, and behavior.
- If your child is struggling, consider requesting evaluation for Section 504 or IDEA, especially if there is concern about possible learning disability.

Child and Adolescent at School

- An orderly and predictable classroom setting.
- Consistent rules and expectations.
- Regular breaks
- Quiet work areas
- Seating near where the teacher does the teaching
- Include a curriculum about time management and study skills
- Teach self-monitoring and self-reinforcement skills
- Establish a system of daily communication

Older Adolescent and Young Adult

- Work on organization, time management and self-motivation strategies.
- Maximize supportive assistive technologies.
- Further self education on ADHD to assist in self-advocacy for accommodations in college and on the job
- Consider CBT and other counseling

Appendix A3. ADHD and Educational Rights

Section 504
Section 504 of the National Rehabilitation Act of 1973, is a civil rights law with the intent to protect the rights of individuals with disabilities. Section 504 is not within Special Education designation but generally provides "reasonable" accommodations and services such as reduced assignments, adjusting testing conditions, and meeting transportation needs.

IDEA
The Individuals with Disabilities Education Act (IDEA) (originally Public Law 94-142 amended in 1997 – Public Law 105-17 and reauthorized in 2004), provides children age 3 to 21 with disabilities (including significant ADHD) legal safeguards. In most cases, the assistance provided and the legal safeguards from IDEA are greater than Section 504.

- The parent must submit a written request for the evaluation.
- The evaluation is multidisciplinary in nature.
- Children with ADHD may be eligible for Special Education categorization under the Otherwise Health Impaired (OHI) At this time, the parent, (the child if older), school psychologist, teacher and other evaluators determine the child's eligibility for special education categorization, document the child's specific needs, target specific outcomes and determine the needed interventions.
- The results of the psychoeducational evaluation are shared with the parent at an Individualized Education Plan Committee (IEPC) meeting.
- If a learning disability is determined the child may be eligible for services for both the ADHD and LD.

Individualized Education Plan (IEP)
An IEP is a written agreement between the parents and the school about what the child needs and what will be done to address those needs. An IEP is a legal document under IDEA that must be drawn up by the educational team for the exceptional child and must be signed by the student's parents before implementation.

REED and RTI
Many school districts around the country are adopting a review and intervention approach before entering into an evaluation under an IEP. School teams will conduct a Review of Existing Educational Data, termed REED and provide targeted support over a period. A Response to Intervention, termed RTI, will then determine if the need has been addressed or if further evaluation for special education services is needed.

Appendix A4. Special Education and Evaluation Terms

Special Education Terms

IEP	Individualized Education Plan
IEPC	Individualized Education Plan Committee
BIP	Behavioral Intervention Plan
SST	Student Study Team
OHI	Otherwise Health Impaired
SLD	Specific Learning Disability
EI	Emotionally Impaired
Section 504	National Rehabilitation Act (1973)
IDEA	Individuals with Disabilities Act (1997)
REED	Review Existing Education Data
RTI	Response to Intervention

Intelligence Tests

WISC	Wechsler Intelligence Scale for Children
K-ABC	Kaufman Assessment Battery for Children
SB-4	Stanford-Binet Fourth Edition
WJ-R	Woodcock Johnson Psychoeducational Battery, Tests of Cognitive Ability

Achievement Tests

WJ-R	Woodcock Johnson Psychoeducational Battery, Tests of Achievement
PIAT-R	Peabody Individual Achievement Test
WRAT-R	Wide Range Achievement Test
WIAT	Weschsler Individual Achievement Test

Appendix B1. Definitions of Selected Psychiatric Disorders: DSM-IV-TR Diagnostic Criteria

Anxiety Disorders

Generalized Anxiety Disorder (GAD) (300.02)

A. Excessive anxiety and worry, occurring more days than not for at least 6 months, about a number of events or activities (such as work or school performance).
B. The person finds it difficult to control the worry.
C. The anxiety and worry are associated with three (or more) of the following six symptoms (with at least some symptoms present for more days than not for the past 6 months). Note: Only one item is required in children.
   (1) restlessness or feeling keyed up or on edge
   (2) being easily fatigued
   (3) difficulty concentrating or mind going blank
   (4) irritability
   (5) muscle tension
   (6) sleep disturbance (difficulty falling or staying asleep, or restless unsatisfying sleep)
D. Anxiety cannot be explained by a Mood Disorder, Pervasive Developmental Disorder, Psychotic Disorder, or another Anxiety Disorder (e.g., PTSD).
E. Symptoms cause clinically significant distress or impairment in functioning.
F. Not due to the direct physiological effects of a substance of abuse, prescribed medication, or general medical condition.

Panic Attacks

A. Discrete period of intense fear or discomfort, in which four (or more) of the following symptoms developed abruptly and reached a peak within 10 minutes:
   (1) palpitations, pounding heart, or accelerated heart rate
   (2) sweating
   (3) trembling or shaking
   (4) sensations of shortness of breath or smothering
   (5) feeling of choking
   (6) chest pain or discomfort
   (7) nausea or abdominal distress
   (8) feeling dizzy, unsteady, lightheaded, or faint
   (9) derealization (feelings of unreality) or depersonalization (being detached from oneself)
   (10) fear of losing control or going crazy
   (11) fear of dying
   (12) paresthesias (numbness or tingling sensations)
   (13) chills or hot flushes

Obsessive-Compulsive Disorder (300.3)

A. Either obsessions or compulsions:
Obsessions as defined by (1), (2), (3), and (4):
   (1) recurrent and persistent thoughts, impulses, or images that are intrusive and cause marked anxiety or distress
   (2) the thoughts, impulses, or images are not simply excessive worries about real-life problems
   (3) the person attempts to ignore or suppress such thoughts, impulses, or images, or to neutralize them with some other thought or action
   (4) the person recognizes that the obsessional thoughts, impulses, or images are a product of his or her own mind
Compulsions as defined by (1) and (2):
   (1) repetitive behaviors (e.g., hand washing, ordering, checking) or mental acts (e.g., praying, counting, repeating words silently) that the person feels driven to perform in response to an obsession, or according to rules that must be applied rigidly
   (2) the behaviors or mental acts are aimed at preventing or reducing distress or preventing some dreaded event or situation; however, these behaviors or mental acts either are not connected in a realistic way with what they are designed to neutralize or prevent or are clearly excessive
B. At some point during the course of the disorder, the person has recognized that the obsessions or compulsions are excessive or unreasonable. Note: This does not apply to children.
C. Symptoms cause marked distress, are time consuming (>1 hour per day), or interfere with functioning.
D. Not restricted to Eating Disorder, Trichotillomania, Body Dysmorphic Disorder, or Substance Use Disorder.
E. Not due to the direct physiological effects of a substance of abuse, a prescribed medication, or a general medical condition.

(continues on next page)

Appendix B1. Definitions of Selected Psychiatric Disorders: DSM IV Diagnostic Criteria (Continued)

Separation Anxiety Disorder (309.21)

A. Developmentally inappropriate and excessive anxiety concerning separation from home or from those to whom the individual is attached, as evidenced by three (or more) of the following:
   (1) recurrent excessive distress when separation from home or major attachment figures occurs or is anticipated
   (2) persistent and excessive worry about losing, or about possible harm befalling, major attachment figures
   (3) persistent and excessive worry that an untoward event will lead to separation from a major attachment figure (e.g., getting lost or being kidnapped)
   (4) persistent reluctance or refusal to go to school or elsewhere because of fear of separation
   (5) persistently and excessively fearful or reluctant to be alone or without major attachment figures at home or without significant adults in other settings
   (6) persistent reluctance or refusal to go to sleep without being near a major attachment figure or to sleep away from home
   (7) repeated nightmares involving the theme of separation
   (8) repeated complaints of physical symptoms (such as headaches, stomachaches, nausea, or vomiting) when separation from major attachment figures occurs or is anticipated

B. Duration of at least 4 weeks.

C. Onset before 18 years.

D. Causes distress or impairment in functioning.

E. Not due to Pervasive Developmental Disorder or a Psychotic Disorder.

Anxiety Disorder Not Otherwise Specified (300.00)

This category includes disorders with prominent anxiety or phobic avoidance that do not meet criteria for any specific Anxiety Disorder, Adjustment Disorder With Anxiety, or Adjustment Disorder With Mixed Anxiety and Depressed Mood.

Bipolar Disorders

Bipolar Disorders

There are six separate criteria sets for Bipolar I Disorder: Single Manic Episode, Most Recent Episode Hypomanic, Most Recent Episode Manic, Most Recent Episode Mixed, Most Recent Episode Depressed, and Most Recent Episode Unspecified. Bipolar I Disorder, Single Manic Episode, is used to describe individuals who are having a first episode of mania. The remaining criteria sets are used to specify the nature of the current (or most recent) episode in individuals who have had recurrent mood episodes.

Manic Episode

A. A distinct period of abnormally and persistently elevated, expansive, or irritable mood, lasting at least 1 week (or any duration if hospitalization is necessary).

B. Persistence of three (or more) of:
   (1) inflated self-esteem or grandiosity
   (2) decreased need for sleep
   (3) more talkative than usual or pressure to keep talking
   (4) flight of ideas or feeling that thoughts are racing
   (5) distractibility (i.e., attention too easily drawn to unimportant or irrelevant external stimuli)
   (6) increase in goal-directed activity or psychomotor agitation
   (7) Involvement in activities with adverse consequences (e.g., over spending, sexual indiscretion)

C. Cause impairment in functioning.

D. Not due to substance of abuse, prescribed medication, or general medical condition.

E. Mania caused by antidepressant treatment should not count toward diagnosis of Bipolar I Disorder.

Hypomanic Episode

A. A distinct period of elevated, expansive, or irritable mood, lasting at least 4 days.

B. Three (or more) of symptoms of mania (see above).

C. Change in functioning that is uncharacteristic of the person and observable by others.

E. Not severe enough to cause marked impairment in social or occupational functioning, or to necessitate hospitalization, and there are no psychotic features.

F. Not due to substance of abuse, prescribed medication, or a general medical condition.

Mixed Episode

A. The criteria are met both for a Manic Episode (see above) and for a Major Depressive Episode (see above) nearly every day during at least a 1-week period.

B. Marked impairment in functioning. Needs hospitalization or has psychotic features.

C. Not due to substance of abuse, prescribed medication, or general medical condition.

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Appendix B1. Definitions of Selected Psychiatric Disorders: DSM IV Diagnostic Criteria (Continued)

Bipolar I Disorder, Single Manic Episode (296.0x)
A. Presence of only one Manic Episode (see above) and no past Major Depressive Episodes.
B. The Manic Episode is not better accounted for by a Psychotic Disorder.

Major Depressive Disorder

Major Depressive Disorder, Single Episode (296.2x)
A. Presence of a single Major Depressive Episode (see below).
B. Not better accounted for by a Psychotic Disorder.
C. There has never been a Manic Episode (see below).

Major Depressive Episode
A. Five (or more) of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one of the symptoms is either (1) depressed mood or (2) loss of interest or pleasure:
(1) depressed mood most of the day, nearly every day, as indicated by either subjective or objective report. In children and adolescents, can be irritable mood.
(2) markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (by subjective or objective report).
(3) significant weight loss when not dieting or weight gain. In children, failure to make expected weight gains.
(4) insomnia or hypersomnia nearly every day.
(5) psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down).
(6) fatigue or loss of energy nearly every day
(7) feelings of worthlessness or excessive/inappropriate guilt.
(8) diminished ability to think or concentrate, or indecisiveness, nearly every day (subjective/objective).
(9) recurrent thoughts of death, recurrent suicidal ideation, suicide attempt, or plan for committing suicide.
B. Symptoms cause distress or impairment in functioning.
C. Not due to a substance of abuse, prescribed medication, or a general medical condition.
E. Not better accounted for by Bereavement.

Fetal Alcohol Syndrome (FAS)/Alcohol-Related Neurobehavioral Disorder (ARND)

The teratogenic effects of alcohol produce a range of outcomes extending from full FAS to a milder appearing disorder in which there are no characteristic facial features, but there are clinically significant learning and behavioral problems. Individuals with full FAS have a distinct pattern of facial abnormalities, growth deficiency and evidence of central nervous system dysfunction. In addition to intellectual disability, individuals with FAS may have other neurological deficits such as poor motor skills and hand-eye coordination. They may also have a complex pattern of behavioral and learning problems, including difficulties with memory, attention and judgment. Individuals without full facial features of FAS, but who have clinically significant learning and behavioral problems are diagnosed with Alcohol-Related Neurobehavioral Disorder (ARND). ARND also referred to as Fetal Alcohol Effects (FAE) or partial FAS.

Fragile X Syndrome

Fragile X syndrome is the second most common 'chromosomal' cause of mental impairment after trisomy 21. It is characterized by moderate to severe intellectual disability, macroorchidism, large ears, prominent jaw, and high-pitched jocular speech. Patients typically have flat feet and finger joint hypermobility. Mitral valve prolapse may be present. Many males have relative macrocephaly. Patients may also have tactile defensiveness. This condition accounts for about one-half of X-linked intellectual disability. Frequency estimates vary from 0.5 per 1000 to 2.4:10,000 males.

Cognitive and behavioral profile: Hyperkinetic behavior and a problem with concentration are present in most affected males; therefore this condition can be easily confused with ADHD. Longitudinal observations indicate a deterioration of IQ with age; intellectual disability may, for example, be moderate at age 12 and severe at age 25. Patients frequently may have autistic-like behavior and apparent speech and language deficits, making it easily confused with Autistic Disorder. Psychiatric comorbidity is high, with increased risk of ADHD, oppositional defiant disorder, enuresis, and encopresis. Fragile X syndrome may also be difficult to distinguish from Prader-Willi Syndrome; except patients with Fragile X Syndrome lack the neonatal hypotonia and infantile feeding problems followed by hyperphagia during toddlerhood seen in Prader-Willi.

Inheritance: Fragile X Syndrome is associated with mutations in the FMR1 gene. All mothers of males with the fragile X have been found to be carriers; the mutation must occur either at a low rate or only in males. Twenty percent of males who carry a fragile X chromosome are phenotypically normal; their daughters, to whom they transmit the fragile X chromosome, are likewise normal, but their grandsons are often affected. The brothers of the clinically normal, transmitting males have a low risk, while

grandsons and great-grandsons have much higher risks.

Diagnosis: is made by immunofluorescence studies and is quite reliable. The most efficient and cost effective methodology for diagnosis is cytogenetic analysis, followed by molecular studies only when the fra(X) is seen or suspected.

Learning Disorders (LD)

Learning Disorder/Disability (LD) is a broad term that covers a pool of possible causes, symptoms, treatments, and outcomes. Learning Disabilities can be divided up into three broad categories:

- (1) Developmental speech and language disorders
- (2) Academic skills disorders
- (3) "Other" disorders- includes certain coordination disorders and learning handicaps not covered by the other terms.

Specific Learning Disability

A disorder occurring in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Such disorders include such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. This term does not include children who have learning problems which are primarily the result of visual, hearing, or motor disabilities, of intellectual disability, of emotional disturbance, or of environmental, cultural, or economic disadvantage.

Dyslexia

Dyslexia includes a very broad range of learning disabilities which involve language processing deficits relating to: 1) attention, 2) language, 3) spatial orientation, poor reading and spelling skills, 4) memory, 5) fine motor control issues, and 6) sequencing or difficulty organizing information and instructions into an appropriate order.

Reading Disorder (315.00)

A. Reading achievement, as measured by individually administered standardized tests of reading accuracy or comprehension, is substantially below that expected given the person's chronological age, measured intelligence, and age-appropriate education.
B. Significantly interferes with academic achievement or activities of daily living that require reading skills.
C. If a sensory deficit is present, the reading difficulties are in excess of those usually associated with it.

Mathematics Disorder (315.1)

A. Mathematical ability, as measured by individually administered standardized tests, is substantially below that expected given the person's chronological age, measured intelligence, and age-appropriate education.
B. Significantly interferes with academic achievement or activities of daily living that require mathematical ability.
C. If a sensory deficit is present, the math difficulties are in excess of those usually associated with it.

Disorder of Written Expression (315.2)

A. Writing skills, as measured by individually administered standardized tests (or functional assessments of writing skills), are substantially below those expected given the person's chronological age, measured intelligence, and age-appropriate education.
B. Significantly interferes with academic achievement or activities of daily living that require the composition of written texts.
C. If a sensory deficit is present, the difficulties in writing skills are in excess of those usually associated with it.

Learning Disorder Not Otherwise Specified (315.9)

This category is for disorders in learning that do not meet criteria for any specific Learning Disorder. This category might include problems in all three areas (reading, mathematics, written expression) that together significantly interfere with academic achievement even though performance on tests measuring each individual skill is not substantially below that expected given the person's chronological age, measured intelligence, and age-appropriate education

Appendix B1. Definitions of Selected Psychiatric Disorders: DSM IV Diagnostic Criteria (Continued)

Oppositional Defiant Disorder (313.81)

A. Pattern of negativistic, hostile, and defiant behavior lasting at least 6 months, during which four (or more) of the following are present:
   (1) often loses temper
   (2) often argues with adults
   (3) often actively defies or refuses to comply with adults' requests or rules
   (4) often deliberately annoys people
   (5) often blames others for his or her mistakes or misbehavior
   (6) is often touchy or easily annoyed by others
   (7) is often angry and resentful
   (8) is often spiteful or vindictive
B. The disturbance in behavior causes clinically significant impairment in social, academic, or occupational functioning.
C. The behaviors do not occur exclusively during the course of a Psychotic or Mood Disorder.
D. Criteria are not met for Conduct Disorder, and, if the individual is age 18 years or older, criteria are not met for Antisocial Personality Disorder.

*Behavior must occur more frequently than is typically observed in individuals of comparable age and developmental level.

Post Traumatic Stress Disorder (PTSD; 309.81)

A. The person has been exposed to a traumatic event in which both of the following were present:
   (1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others
   (2) the person's response involved intense fear, helplessness, or horror. Note: In children, this may be expressed instead by disorganized or agitated behavior
B. The traumatic event is persistently reexperienced in one (or more) of the following ways:
   (1) recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. Note: In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
   (2) recurrent distressing dreams of the event. Note: In children, there may be frightening dreams without recognizable content.
   (3) acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). Note: In young children, trauma-specific reenactment may occur.
   (4) intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
   (5) physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following:
   (1) efforts to avoid thoughts, feelings, or conversations associated with the trauma
   (2) efforts to avoid activities, places, or people that arouse recollections of the trauma
   (3) inability to recall an important aspect of the trauma
   (4) markedly diminished interest or participation in significant activities
   (5) feeling of detachment or estrangement from others
   (6) restricted range of affect (e.g., unable to have loving feelings)
   (7) sense of a foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span)
D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:
   (1) difficulty falling or staying asleep
   (2) irritability or outbursts of anger
   (3) difficulty concentrating
   (4) hypervigilance
   (5) exaggerated startle response
E. Duration of the symptoms is more than 1 month.
F. Causes distress or impairment in functioning.

Appendix B1. Definitions of Selected Psychiatric Disorders: DSM IV Diagnostic Criteria (Continued)

Reactive Attachment Disorder of Infancy or Early Childhood (313.89)

A. Markedly disturbed and developmentally inappropriate social relatedness in most contexts, beginning before age 5 years, as evidenced by either (1) or (2):
   (1) persistent failure to initiate or respond in a developmentally appropriate fashion to most social interactions, as manifest by excessively inhibited, hypervigilant, or highly ambivalent and contradictory responses (e.g., the child may respond to caregivers with a mixture of approach, avoidance, and resistance to comforting, or may exhibit frozen watchfulness)
   (2) diffuse attachments as manifest by indiscriminate sociability with marked inability to exhibit appropriate selective attachments (e.g., excessive familiarity with relative strangers or lack of selectivity in choice of attachment figures)

B. The disturbance in Criterion A is not accounted for solely by developmental delay and does not meet criteria for a Pervasive Developmental Disorder

C. Pathogenic care as evidenced by at least one of the following:
   (1) persistent disregard of the child's basic emotional needs for comfort, stimulation, and affection
   (2) persistent disregard of the child's basic physical needs
   (3) repeated changes of primary caregiver that prevent formation of stable attachments (e.g., frequent changes in foster care)

Appendix B2. Conditions That May Be Confused with ADHD

Note: For confused or comorbid conditions, referral to specialist in these disorders is recommended. See Appendix B for DSM IV diagnostic criteria for conditions.

	Anxiety Disorders
Prevalence	26% (CI: 18%, 35%)
Overlapping Symptoms	• Poor concentration • Appear fidgety and/or agitated • Difficulty settling to sleep +/- Insomnia • Jumps from task to task • Both may have poor appetite
Distinguishing Symptoms of This Disorder	• School avoidance • Excessive performance or test-taking anxiety • Reluctance to participate in age-appropriate activities (sleep-overs, outings) • Excessive worry (e.g., school work, illness) • Over-concern about "adult matters" (e.g., finances, parental relationships, parental welfare) • Catastrophic thoughts (e.g., car accidents, kidnapping, break-ins) • Compulsive behaviors (e.g., hoarding, counting, ordering) • Nightmares, excessive worries/fears at bedtime • Physiological symptoms: racing heart beat, difficulty breathing, chest pain • Patient becomes "anxious" or has visual hallucinations in response to stimulants
Distinguishing Symptoms of ADHD	• Should not see significant symptoms of anxiety in uncomplicated ADHD.
	Bipolar Disorder
Prevalence	Diagnosis of Bipolar Disorder in children and adolescents is highly controversial; therefore, rates are unreliable. Lewinsohn et al. (1995) reported a lifetime prevalence of 1% for Bipolar Disorders in a large community sample of older adolescents.
Overlapping Symptoms	• Inattention, easily distracted • Motor activity • Sleep disturbance • Accident prone • Disruptive behavior • Hypertalkativeness
Distinguishing Symptoms of This Disorder	Highly controversial diagnosis in children. Always refer to child psychiatrist if suspected. • Mood swings; behavior is cyclical or erratic • Being kicked out of multiple daycare programs is a red flag. • Parents report the child has "no control" over behavior • Grandiosity (Exaggerated ideas of ability and importance). For example, the child may think they can teach the class better than the teacher" despite failing in school. • Severe aggression (especially toward adults); "rage attacks" • Hypersexuality- sexual jokes or language, inappropriately touching adults • Hallucinations • Severe insomnia • Extreme changes in energy levels and behavior • Rage attacks • Irrational ideas • Tangential speech, rapid/pressured speech • Extremely impulsive +/- self-endangering behavior • Extreme hyperactivity- esp. if climbs excessively or seems to be "fearless" • Intrusive behavior • Suicidal behavior in children under 13 is concerning and warrants urgent psychiatric evaluation

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Appendix B2. Conditions That May Be Confused with ADHD (Continued)

	Bipolar Disorder (continued)
Distinguishing Symptoms of ADHD	• ADHD symptoms should be present since childhood, whereas, Bipolar Disorder typically occurs later (most commonly around puberty) • Problems are chronic and more consistent in ADHD rather than cyclical in Bipolar disorder • Aggression, if it occurs, is usually not severe in uncomplicated ADHD & generally related to frustration • Grandiosity, hypersexuality, and psychosis are NOT typical in ADHD • Sleep problems are generally not severe and rarely are cyclical in ADHD • In samples of prepubertal patients with Bipolar Disorder, almost 100% have co-morbid ADHD. In adolescent Bipolar sample, rates of co-morbid ADHD and Bipolar Disorder are 30-50%
	Fetal Alcohol Syndrome(FAS)/ Alcohol-Related Neurobehavioral Disorder (ARND) [**Note:** ARND is also called Fetal Alcohol Effects (FAE) or partial FAS]
Prevalence	**FAS:** 0.33 cases per 1,000 live births **ARND:** Several times the magnitude of FAS cases.
Overlapping Symptoms	• Poor academic performance • Inattention • Hyperactivity • Poor growth (not on stimulants) • Disruptive behavior
Distinguishing Symptoms of This Disorder	• Must have proven or strong suspicion of exposure to alcohol in utero • +/- Growth deficiencies • +/- Skeletal deformities (especially microcephaly) • +/- Facial abnormalities (short palpebral fissures, long/flat philtrum, thin upper lip; flat midface, pstosis; nearsightedness; strabismus; short upturned nose; cleft palate; micrognathia; low-set or poorly formed ears • +/- Organ deformities (heart, genitourinary • CNS: intellectual disability; learning disabilities; short attention span- look for "soft" neurological signs • May preferentially respond to Dexedrine or Adderall versus Ritalin. May require high stimulant dose and/or multiple psychotropic medication (including antipsychotics or mood stabilizer) at high doses to control symptoms • Often needs special education services.
Distinguishing Symptoms of ADHD	• Characteristic facial features of FAS are not present in ADHD or ARND • Aggression, if it occurs, usually is not severe in uncomplicated ADHD; however, may be more severe in some patients with FAS/ARND • Most patients have average (or higher) IQ; whereas, many patients with FAS have MR • Appetite and growth problems are less severe • Most children with uncomplicated ADHD are otherwise healthy; whereas, children with severe FAS often have many medical problems and often appear unhealthy
	Learning disorders: Reading, Mathematics, Language, Articulation disorders, Written +/-Receptive
Prevalence	Not known; however, the CDC (1987) estimated 5%-10%
Overlapping Symptoms	• Both have a higher prevalence in males: 3-5:1 • Both can have very poor handwriting and poor reading comprehension • Poor school performance, may not be evident immediately • Often dislike and/or avoid school
Distinguishing Symptoms of This Disorder	• Look for specific areas of academic difficulty • Definitive diagnosis made by psychoeducational testing (neuropsychological testing may be beneficial)
Distinguishing Symptoms of ADHD	• Although children with either condition may have variable performance ability, children with ADHD more obviously perform better at tasks they enjoy.

Appendix B2. Conditions That May Be Confused with ADHD (Continued)

	Major Depressive Disorder
Prevalence	Preadolescence: 1-5%, Adolescence: 5-10% Prior to puberty the gender ratio for depressive disorders is 1:1. After puberty the ratio is 2:1 ratio for females to males, which continues into adulthood.
Overlapping Symptoms	• Poor concentration • Difficulty settling to sleep +/- insomnia • Poor self-esteem • Indecision • May appear fidgety and/or agitated • +/- Poor appetite
Distinguishing Symptoms of This Disorder	• Frequent/excessive sadness +/- tearfulness • Irritability, agitation, hostility, anger, moodiness • Lack of enthusiasm, poor motivation, constant boredom • Extreme sensitivity to rejection, poor self esteem • Suicidal ideation or self-injurious behavior • Sad themes in play/drawings • Feelings of hopelessness, worthlessness, or excessive guilt • Change in school performance or behavior: decreased grades, change in pattern of socialization, withdrawal from activities • Neurovegitative changes: (1) sleep (2) appetite (3) energy • +/- life stressors: relationship break-up, parental divorce, bereavement, chronic illness, etc. • Frequent physical complaints, e.g., headaches, stomachaches • Suicidal behavior in children under 13 (a concerning symptom that warrants psychiatric evaluation)
Distinguishing Symptoms of ADHD	• ADHD symptoms should be present since childhood before onset of depression. • Symptoms of ADHD are consistent and chronic; although there may be a gradual increase in symptoms with increasing expectations at school/work • There may be poor self-esteem in children with untreated ADHD. However, if sadness and tearfulness are daily or if there is self-injurious behavior or suicidal ideation think about depression. • Depression may be co-morbid with ADHD • Sleep difficulty is generally characterized by trouble settling to sleep and early awakening rather than severe initial insomnia or middle awakening • Poor PO intake can be related to inattention and hyperactivity at meals
	Oppositional Defiant Disorder
Prevalence	35% (CI: 27%, 44%)
Overlapping Symptoms	• Fail to follow directions • May appear to ignore others • Disruptive behavior
Distinguishing Symptoms of This Disorder	• Pattern of negativistic, hostile, and defiant behavior: angry, argumentative • Refuses to comply with adults' requests • Blames others, vindictive • Especially has difficulty interacting with parents and authority figures • Family and social history are very important, e.g., depression, abuse
Distinguishing Symptoms of ADHD	• ADHD symptoms should be present since childhood. • Children with ADHD often do not follow directions well; however, this is due to forgetfulness, distractibility, rather than refusal. • Over time, children with untreated or residual ADHD symptoms may dislike and/or avoid school or tasks/situations that require sustained attention or sustained sitting.

Appendix B2. Conditions That May Be Confused with ADHD (Continued)

	Post Traumatic Stress Disorder (PTSD)
Prevalence	15%– 40% of children have experienced at least one traumatic event in their lifetime. Of these, 5-10% have PTSD.
Overlapping Symptoms	• Hyperactivity or agitation • Memory and attentional difficulties • Difficulty settling to sleep +/- Insomnia
Distinguishing Symptoms of This Disorder	• Must have history of trauma • Hypervigilance • Nightmares • Flashbacks • Feeling detached or estranged • Reenactment of trauma in play, drawings, or verbalizations. • May see speech disturbances, poor sleep, poor appetite and other physiologic symptoms
Distinguishing Symptoms of ADHD	• ADHD symptoms should be present since early childhood. • Note that children with ADHD often have parents with ADHD who may have had difficult lives (unwanted pregnancy, substance abuse, MVA) because of untreated ADHD. Think about the possibility of primary PTSD or co-morbid ADHD + PTSD.
	Reactive Attachment Disorder (RAD)
Prevalence	Experts in RAD estimate that this disorder has been misdiagnosed as Bipolar Disorder or Attention Deficit Disorder in 40 to 70 percent of cases.
Overlapping Symptoms	• Both may be "overly sociable" and/or hypertalkative • Difficulty sleeping • Poor growth • Disruptive behavior • Poor social skills
Distinguishing Symptoms of This Disorder	• History of neglect, abuse, separation from parents, early severe chronic illness, multiple caretakers • Either: Indiscriminate friendliness with strangers, e.g., hugs strangers • Or: Withdrawal/aloofness with others with extreme mistrust of nearly everyone. • "Hoarding" food or belongings is a red flag
Distinguishing Symptoms of ADHD	• May see night-time wandering +/-night-time binge eating • May have a wasted/pale appearance- "waif-like" • Often are emotionally detached and may have restricted or superficial expression of emotions • These children may be quite "needy" of attention and tend to tire-out caretakers • • Persons with untreated or poorly treated ADHD are at increased risk for difficult and chaotic lives (unwanted pregnancy, substance abuse, MVA). Therefore, children with RAD are also at increased risk of ADHD by heredity. RAD may look like ADHD, but there may also be co-morbid ADHD + RAD.

Appendix B3. Special Patient Populations

Preschool age (3-5 year olds)	Diagnosis • May be difficult to determine whether hyperactivity, impulsivity, and inattention are due to normal developmental variation. Treatment/referral • Some patients with severe symptoms may require medication. • Parent education and training is important • Referral to practitioners with expertise in developmental pediatrics and/or child psychiatric disorders is recommended for diagnosis and treatment.
Closed head injury	Diagnosis • Patients with head injury (and static encephalopathy from other etiologies) are at increased risk for impulsivity and inattention. • There are reported cases of young children that developed (permanent) symptoms consistent with ADHD after severe head injury, encephalitis, or brain tumor. Co-morbidity • Watch for co-morbid seizures. • Watch for aggression, personality changes, mood and anxiety symptoms. Treatment/referral • Patients may respond to stimulant treatment only or may require other medications, e.g., antipsychotic medication (risperidone) or mood stabilizers (carbamazepine). • Referral to practitioners with expertise in developmental pediatrics, child psychiatric disorders, and/or neurologic disorders is recommended for assistance with diagnosis and treatment. • Encourage special education services and IEP development
Intellectually disabled patients	Diagnosis • Data are limited regarding the diagnosis and treatment of ADHD in MR patients- relatively more information exists for autistic disorders. • Diagnosis must take into account the maturity and developmental challenges of the patient. • ADHD can co-occur with mild-moderate MR. • ADHD is difficult to diagnose with severe to profound MR. • ADHD (especially inattentive type) is difficult to diagnose with low average or borderline IQ. Co-Morbidity • Watch for co-morbid seizures. • Watch for personality changes, mood and anxiety symptoms. • Watch for aggression, irritability, hypomania, and hallucinations, especially if using stimulants. Treatment/Referral • MR patients with ADHD may respond well to stimulant treatment, however, some patients may become irritable with stimulant treatment. • Clonidine (Catapres®) and guanfacine (Tenex®) may be more helpful than stimulants for some patients with MR as the main problems are often hyperactivity and impulsivity. • All MR patients should have an IEP to facilitate appropriate educational curriculum and services. • Referral to practitioners with expertise in developmental pediatrics and/or child psychiatric disorders is recommended.
Fetal Alcohol Syndrome (FAS) and Alcohol-Related Neurobehavioral Disorder (ARND) **[Note: ARND is also called Fetal Alcohol Effects (FAE) or partial FAS]**	Diagnosis • A genetics referral may be helpful in diagnosis. • Some centers have multidisciplinary clinics for diagnosis where treatment may also be provided. • Many (get %) patients with FAS have symptoms consistent with ADHD. (call Sheila Gahagan/Keiran O'Malley). Co-Morbidity • Patients with FAS have a higher incidence of cardiac and renal problems (take care when prescribing psychotropic medications). • Mood symptoms are common. Treatment/Referral FAS/ARND patients with ADHD may respond to stimulant treatment but they may require higher doses than typical ADHD patients or may require other medications, e.g., antipsychotic medication (risperidone) or mood stabilizers (carbamazepine).

Appendix B3. Special Patient Populations (continued)

FAS and ARND (continued)	• There is emerging evidence that FAS/ARND patients may respond preferentially to amphetamine versus methylphenidate (cite O'Malley) • Patients often require psychoeducational testing and an IEP. They may require special education services due to math and/or language learning disorders or MR. • FAS is a *static* encephalopathy- cognitive deficits usually do *not* substantially improve with time. • Referral to a practitioner with expertise in genetics, developmental pediatrics, neurology, and/or child psychiatric disorders is recommended for assistance with diagnosis and treatment.
13 years – Adult	<u>Diagnosis</u> • ADHD is a chronic condition that extends across developmental phases and may persist into adulthood. • Murphy & Barkley (1996) estimated that 2-4% of adults have ADHD. • Data are emerging regarding diagnosis and treatment of affected adults. <u>Co-Morbidity</u> • Diagnosis is adulthood is often confounded by co-morbid diagnoses, e.g., mood disorders, substance abuse disorders. <u>Treatment/Referral</u> • No specific guidelines are available regarding medication discontinuation, however, most persons with ADHD benefit from continuing medication throughout high school. Approximately 1/3 of affected individuals benefits from medication treatment into adulthood. • More difficult to diagnose ADHD retrospectively in adults for whom the illness was previously undiagnosed. • No data are available on drug therapy in pregnancy.
Substance Abusing Patients	<u>Treatment</u> • Medication treatment for ADHD has been demonstrated to reduce the risk of subsequent substance use disorders. • Medication treatment of co-morbid ADHD and substance use disorders is possible but patients require careful monitoring. Non-controlled substances may be useful (e.g., bupropion, atomoxetine). • Stimulant medications are commonly abused, therefore, most are schedule II medications. True physiological dependence is rare and usually does not occur unless very high doses are used. • Talk about substances of abuse and caffeine.

Appendix B4. Overview of Complementary and Alternative Medicine Associated with ADHD

Therapy	Use	Dose	Side Effects	Evidence
General				
Expressive (sensory integration, occupational therapy, music, dance, art)	ADHD and neurodevelop-mental disorders		None	Anecdotal
Diet restriction (Feingold, red dye, sugars)	ADHD			Most controlled studies show no benefits or limited benefits only for small groups of children
Megavitamins				
Neurofeedback (EEG biofeedback)	ADHD, Tics, Seizures	20-40 sessions	None	Small studies suggest some benefit
Opometric vision training	ADHD		None	No systematic data
Supplements: ADHD				
Ginkgo biloba	Antioxidant Improves blood flow. Small benefit to adult cognitive function.	120-240 mg/d (Adult)	Headache, dizziness, arrhythmias, hypotension, GI upset (nausea, vomiting, diarrhea), restlessness, cutaneous hyper-sensitivity. Avoid in bleeding disorders.	One open label study in 36 children who received combination herbal given BID x 4 weeks ▪ Improvement in Conners' ADHD index at 4 weeks ▪ 14% of subjects reported adverse effects related to study medication
Fish oil (omega-3, EPA, DHA)	hyperlipidemia, hypertriglyceridemia, hypertension	500-1000 mg/d (Adult)	Flatus, halitosis, heartburn, (high doses): nausea, loose stools, (doses > 3gm/d): Avoid in bleeding disorders, (long-term) weight gain	One blinded RCT in 63 children who received DHA (345 mg/d) x 4 months showed no statistically significant improvement in any objective or subjective measure of ADHD symptoms
Evening primrose oil (linolenic, gamma linoenic acid)		500mg 3-6x/d (Adult)	High dose or chronic use: Nausea, diarrhea, headache	Two blinded placebo control crossover studies suggest some behavioral improvement
Supplements: Sleep disorder				
Melatonin (N-acetyl-5-meth-oxytryptamine)	Sleep disorders	Melatonin 6-12Y: 3-6 mg PO at bedtime (scheduled, not PRN) Melatonin > 12Y: 6-9 mg PO at bedtime	Sleepiness, fatigue, headache. Possible proconvulsant with multiple neurologic disabilities. May suppress puberty.	One RCT in 25 children with ADHD and chronic insomnia (5 mg melatonin) ▪ Decreased sleep latency and increased total sleep time. One open label study in 24 children with ADHD who received 3 mg melatonin ▪ Statistically significant decrease in time to falling asleep reported after short- and long-term use