

Attention Deficit Hyperactivity Disorder



Attention Deficit Hyperactivity Disorder

Introduction/ Purpose Statement

Chances are, you know someone who has Attention Deficit Hyperactivity Disorder (abbreviated ADHD or AD/HD). The purpose of this home study is to help you to better understand this prevalent problem. You will learn what ADHD is, how it is diagnosed and treated, other conditions that tend to accompany ADHD, as well as some strategies that can be used to manage behavior.

Target Audience

This home study was designed for nurses who have no familiarity with ADHD; however, all health care professionals are invited to complete this packet.

Content Objectives

1. Describe behavior that may indicate ADHD.
2. Identify co-morbid disorders to ADHD.
3. Identify 2 or more medications used to treat ADHD.
4. Describe other elements, besides medication, that should be included in the plan of treatment for ADHD.

Disclosures

In accordance with ANCC requirements governing approved providers of education, the following disclosures are being made to you prior to the beginning of this educational activity:

Requirements for successful completion of this educational activity:

In order to successfully complete this activity you must read the home study, complete the post-test and evaluation, and submit them for processing.

Conflicts of Interest

It is the policy of the Twin Cities Health Professionals Education Consortium to provide balance, independence, and objectivity in all educational activities sponsored by TCHP. Anyone participating in the planning, writing, reviewing, or editing of this program are expected to disclose to TCHP any real or apparent relationships of a personal, professional, or financial nature.

Dr. Reeve is the Director of Psychopharmacology Research at Regions Hospital. Dr. Reeve is also part of a speaker's bureau for MacNeil and Lilly drug companies and receives research grants from Cephalor, MacNeil, Pfizer, AZ, BMS, and Merck. Her information and suggestions were reviewed carefully by TCHP and have been found to be free of bias.

Relevant Financial Relationships and Resolution of Conflicts of Interest:

If a conflict of interest or relevant financial relationship is found to exist, the following steps are taken to resolve the conflict:

1. Writers, content reviewers, editors and/or program planners will be instructed to carefully review the materials to eliminate any potential bias.
2. TCHP will review written materials to audit for potential bias.
3. Evaluations will be monitored for evidence of bias and steps 1 and 2 above will be taken if there is a perceived bias by the participants.

Dr. Reeve is the Director of Psychopharmacology Research at Regions Hospital. Dr. Reeve is also part of a speaker's bureau for MacNeil and

Lilly drug companies and receives research grants from Cephalor, MacNeil, Pfizer, AZ, BMS, and Merck. Her information and suggestions were reviewed carefully by TCHP and have been found to be free of bias.

Sponsorship or Commercial Support:

Learners will be informed of:

- Any commercial support or sponsorship received in support of the educational activity,
- Any relationships with commercial interests noted by members of the planning committee, writers, reviewers or editors will be disclosed prior to, or at the start of, the program materials.

This activity has received no commercial support outside of the TCHP consortium of hospitals other than tuition for the home study program by non-TCHP hospital participants.

If participants have specific questions regarding relationships with commercial interests reported by planners, writers, reviewers or editors, please contact the TCHP office.

Non-Endorsement of Products:

Any products that are pictured in enduring written materials are for educational purposes only. Endorsement by WNA-CEAP, ANCC, or TCHP of these products should not be implied or inferred.

Off-Label Use:

It is expected that writers and/or reviewers will disclose to TCHP when “off-label” uses of commercial products are discussed in enduring written

materials. *Off-label use of products is not covered in this program.*

Expiration Date for this Activity:

As required by ANCC, this continuing education activity must carry an expiration date. The last day that post tests will be accepted for this edition is **December 31, 2017**—your envelope must be postmarked on or before that day.

Planning Committee/Editors

Linda Checky, BSN, RN, MBA, Assistant Program Manager for TCHP Education Consortium.

Lynn Duane, MSN, RN, Program Manager for TCHP Education Consortium.

Author

Linda Checky, BSN, RN, MBA, Assistant Program Manager for TCHP Education Consortium.

Content Experts

Nancy Dillon, PhD, RN, Patient Education Coordinator for the Minneapolis VA Medical Center.

Karen Jones, BSN, RN, Nurse Educator for Regions Hospital.

***Elizabeth Reeve, MD**, Staff Child and Adolescent Psychiatrist and Director of Psychopharmacology Research at Regions Hospital. Dr. Reeve is also part of a speaker’s bureau for MacNeil and Lilly drug companies and receives research grants from Cephalor, MacNeil, Pfizer, AZ, BMS, and Merck.

***Mary Ellen Swanson, RN**, Staff Nurse in the Emergency Room at Hennepin County Medical Center.

*Denotes reviewers of current edition

Contact Hour Information

<p>For completing this Home Study and evaluation, you are eligible to receive:</p>	<p>2.0 MN Board of Nursing contact hours / 1.66 ANCC contact hours</p> <p><i>Criteria for successful completion:</i> You must read the home study packet, complete the post-test and evaluation, and submit them to TCHP for processing.</p> <p>The Twin Cities Health Professionals Education Consortium is an approved provider of continuing nursing education by the Wisconsin Nurses Association, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation.</p>
---	---

Please see the last page of the packet before the post-test for information on submitting your post-test and evaluation for contact hours.

What exactly is ADHD?

A great majority of the research suggests that ADHD is a neurobiological disorder. It is believed that the symptoms of ADHD are caused by chemicals in the brain that are not working properly. These chemicals are called neurotransmitters. The neurotransmitters thought to be involved in ADHD are dopamine, norepinephrine, and serotonin. These chemical messengers interrupt the normal flow of messages throughout the body when they are in low supply. When neurotransmitters are not working properly, children have difficulty paying attention, controlling impulses, suppressing inappropriate responses and regulating motor activity.¹

Children, teenagers, and adults with this disorder have problems with attention and learning that may cause problems at home, school, and/or work.² ADHD affects 3-5% of school-age children and 2-4% of adults.³ It is characterized by developmentally inappropriate attention, and, in some cases, hyperactivity and impulsivity.

Brandon, age 3, is a human tornado. He is always on the run, leaving a trail of toys behind him. He darts from one activity to another and cannot sit still long enough to eat a meal. He runs out into the street without looking and is occasionally aggressive with other kids (hitting, pushing, and kicking).

Sarah, age 14, struggles in school and at home. Her room is a disaster and her backpack is stuffed with wadded up papers. Sarah constantly finds her mind wandering in school and she is failing several classes despite her above average IQ. She frequently forgets to do her homework or forgets to turn it in. She writes very slowly and has a terrible time writing papers and doing math computations.

John, age 38, loves pattering around in his garage. The garage is stuffed full of unfinished projects. His wife jokes about his lack of organization, stating that no matter how many times she puts his tools back in

the tool chest, she will find the tools here and there all over the garage, house, and yard with the tool chest nearly empty. John has had a difficult time holding a job because he just can't seem to concentrate. He lost his last job as a mechanic when he drove a car off the lift without the lug nuts attached.

These three people provide a glimpse into some of the behaviors and struggles faced by those with ADHD. While fictitious, their stories are not unique.

What do the letters mean?

When you read about attentional disorders, there are several names and abbreviations that are used to describe the disorders.

A=Attention
D=Deficit
H=Hyperactivity
D=Disorder

Doctors use the DSM IV (Diagnostic and Statistical Manual, 4th Edition) to classify the types of ADHD.⁴ The diagnosis is broken down into several subtypes. You must have 6 symptoms in a category to qualify for a diagnosis.

ADHD--Predominantly Inattentive type

- Does not give close attention to details or makes careless mistakes
- Has difficulty sustaining attention
- Does not appear to listen
- Struggles to follow through on instructions
- Has difficulty with organization
- Avoids or dislikes tasks requiring sustained mental effort
- Easily distracted
- Is forgetful in daily activities

ADHD--Predominantly Hyperactive-Impulsive type

- Fidgets with hands or feet or squirms in chair
- Has difficulty remaining seated
- Runs about or climbs excessively
- Difficulty engaging in activities quietly
- Acts as if driven by a motor

- Talks excessively
- Blurts out answers before questions have been completed
- Has difficulty waiting or taking turns
- Interrupts or intrudes upon others

ADHD--Combined type

- Meets both sets of criteria for inattention and hyperactive/impulsive types

Hey, you may be thinking, that pretty much describes every kid I've ever met! The key here is that the behavior is developmentally inappropriate. There is a developmental failure in the brain circuitry that underlies inhibition and self-control. This in turn impairs other brain functions that are crucial for maintaining attention, including the ability to defer immediate rewards for later but greater gain. That's why many kids aren't diagnosed with this disorder until the first or second grade. Some kids, particularly if they lack hyperactivity, may not be diagnosed until they are a teen or even an adult.

With ADHD it is not an issue of won't, it is an issue of can't. The child simply cannot sustain attention and focus. Many children are high energy, the difference is that if they need to they can muster concentration and focus on the task at hand. Children and adults with ADHD have difficulty with concentration and focus even when they really need it.

Of the subtypes listed, most tend to fall into the combined category (75%), exhibiting the combined symptoms of inattention and hyperactivity-impulsivity. About 15-20% fall into the inattentive category, exhibiting only signs of inattention and only 5-10% are in the hyperactive-impulsive category, exhibiting hyperactivity and impulsivity but not inattention.⁵

The subtypes listed describe straightforward, "plain vanilla" ADHD. For many children and adults, there is more to deal with than just the ADHD symptoms.

Other Disorders Associated with ADHD

The tendency for disorders to occur together is called comorbidity. There are a number of comorbid conditions that tend to occur with ADHD. Whenever an additional problem is present with ADHD it makes life much more difficult than with ADHD alone.

Oppositional Defiant Disorder (ODD)

Between 30-50% of children (mostly boys) with ADHD will also have ODD.^{6, 7} ODD is more commonly associated with the hyperactive-impulsive and combined subtypes and is characterized by argumentativeness and a tendency to purposefully bother and irritate others. The criteria for ODD include a pattern of negativistic, hostile, and defiant behavior lasting at least six months during which four or more of the following are present:

- Often loses temper
- Often argues with adults
- Often actively defies or refuses to comply with adults' requests or rules
- Often deliberately annoys people
- Often blames others for his or her mistakes or misbehavior
- Is often touchy or easily annoyed by others
- Is often angry and resentful
- Is often spiteful and vindictive

No one knows for sure what causes ODD, but the usual pattern is for problems to begin between ages 1-3 years. Like ADHD, the problem tends to run in families. If a parent is alcoholic or has been in trouble with the law, their child is almost three times as likely to have ODD. Children that have ODD take one of three main paths as they grow up. They will either outgrow the problem (but the aggressiveness is likely to remain), or they will develop a conduct disorder (usually happens fairly early—within 3-4 years of ODD), or, most commonly, they will continue to have ODD. Children with ODD frequently develop signs of mood disorders or anxiety as they get older. About 25% will have mood or anxiety problems by the end of elementary school.

Conduct Disorder (CD)

Conduct disorder describes a group of symptoms in children who have trouble with rule breaking and aggression. About 20-40% of ADHD children will eventually develop conduct disorder.⁷ Children with a conduct disorder will often try to break rules without getting caught. They may be aggressive to other people or animals, destroy property, lie or steal things from others, fight or bully others, carry or use weapons, break into people's homes, commit vandalism, run away, skip school, or break curfews. Children and teens with conduct disorder are at greater risk for substance use, dependence, and abuse. Adults with a conduct disorder are often in trouble with the law. Immediate help is needed to improve the individual's chance for a more successful future.^{7,8}

Tics and Tourette's Syndrome

Tics are uncontrollable mannerisms or movements such as excessive eye blinking, flinching, shrugging, or throat clearing. Transient tics usually go away gradually over a 1-2 year period of time and are just as likely to occur in the child with ADHD as in any other child.

Children with both motor and verbal tics that last more than a year may have Tourette's syndrome. Only about 7% of those with ADHD have tics or Tourette's syndrome, but 60% of those with Tourette's syndrome have ADHD.⁹ One of the side effects of some ADHD medications can be the development of a motor or verbal tic. It is important to know that the tic will go away if the medicine is stopped. Persons with Tourette's syndrome or those who already have tics may have a worsening of tics with medication. Sometimes lowering the stimulant dose can decrease the tics. Typically, symptoms of ADHD precede Tourette's symptoms by an average of 2.5 years.¹⁰

Mood Disorders

Both sad and depressive moods and persisting elevated and/or irritable moods (mania) occur more often with ADHD than would be expected by chance. About 10-30% of children and 47%

of adults with ADHD also have depression.¹¹ A bipolar disorder occurs in up to 20% of individuals and anxiety occurs in up to 30% of children and 25-40% of adults with ADHD.¹¹

Learning Disabilities

A learning disability can be defined as a condition where academic performance is below what would be expected given the IQ. In other words, these kids can be of normal or even above average intelligence but unable to translate that intelligence into performance at school. Up to 60% of ADHD children have a co-existing learning disorder.⁹ Learning disabilities tend to occur more in the inattentive and combined subtypes.

Children with ADHD often have problems learning reading, spelling, and/or math. Math computation is often a major problem. They may have lower grades and lower test scores on standardized achievement tests. Some have expressive language deficits which make it difficult for them to organize their thoughts and express themselves clearly when speaking and writing. In school they may have trouble following directions, lectures, and taking notes. Many have fine motor deficits resulting in very poor handwriting.¹²

Substance Abuse

There have been a number of studies on smoking, alcohol, and drug abuse in children and adults with ADHD. The results have been mixed, which has not helped allay concerns that stimulant therapy in children with ADHD may set them up for substance abuse later in life. A meta-analytic review of the literature in 2003 helped to make sense of the volume of literature that exists. It looked at all available studies of children, adolescents, and adults with ADHD that looked at childhood exposure to stimulant therapy and later substance abuse problems. The results indicated that children medicated with stimulants were actually less likely to have a substance or alcohol use disorder when compared to unmedicated children with ADHD.¹³ In fact, the risk for substance abuse in medicated ADHD youths did not differ from the non-ADHD controls.

Individuals with ADHD appear to be at an increased risk for early cigarette use. Adults that have ADHD have elevated rates of smoking and have great difficulty quitting. ADHD youth are twice as likely to become addicted to nicotine as non-ADHD youth.^{14, 15} The aggregate literature, however, suggests that this increased risk is unrelated to stimulant therapy.¹⁶

Additional Problems

In addition to the comorbid conditions just covered, children with ADHD often have impairments in memory, cognitive processing, sequencing, motor skills, social skills, modulation of emotional response, and response to discipline. Sleep disorders are also more prevalent. These impairments may not warrant an additional diagnosis, but are real problems nonetheless. Social skills, in particular, are often a big problem that lingers into adulthood. Children that have significant hyperactivity and impulsivity tend to have more difficulty with social skills. Many parents of children with ADHD will attest to the fact that their child has few, if any, friends. This can be a heartbreaking situation for the parents and child. If the child does manage to find a friend, often it is another child who is struggling with ADHD or other problems. In this situation, the parents may not be sure if it is a good idea for their child to be friends with this other child. There are no easy answers to these kinds of questions.

Diagnosing Children With ADHD

There is no single test to diagnose ADHD. A comprehensive evaluation is needed to establish the diagnosis, rule out other causes and determine the presence of comorbid conditions. A simple screening is usually done initially to determine if the child is likely to have ADHD. The screening often takes the form of a few questions related to characteristics identified in the DSM-IV classification. If the screening tool reveals behavior that is consistent with ADHD, the next step is to proceed to a more thorough evaluation.

A medical exam by a physician should be conducted, including hearing and vision tests, to make sure a medical condition is not causing

symptoms similar to ADHD. Conditions that can look like ADHD include:

- Underachievement due to a learning disability
- Lapses in attention due to seizures
- Hearing problems
- Behavior problems that are due to anxiety or depression

A careful history should be taken from the parents, teachers, and the child (if appropriate). Checklists that rate ADHD symptoms are used to identify how frequent and severe the behaviors are. Some children may be checked for social adjustment and mental health. Tests of intelligence and learning achievement may also be given to see if the child has a learning disability and whether the disabilities are in all or only certain parts of the school curriculum. Many children with ADHD also have a specific learning disability, typically in reading and math.

For a diagnosis of ADHD, symptoms must appear early in life (before age 7), and continue for at least 6 months. In children, the symptoms must be more frequent or severe than in others the same age. Most importantly, the behaviors create a real handicap in at least two areas of the person's life, such as home, school, work, or social settings.

Brandon is now in kindergarten and his teacher has expressed concern over his ability to manage in school. He leaves his seat frequently, plays with things that are off-limits, blurts out answers, and butts in line. His teacher recommended an evaluation and, after much testing, Brandon is found to have the combined type of ADHD.

Sarah is having so much trouble concentrating that she burst into tears and asked "What is wrong with me?" when her parents took her to see the school psychologist. The psychologist referred Sarah to her doctor for a complete examination and began a comprehensive examination of her own, including interviews

with Sarah, her parents, and teachers. Sarah is found to have the inattentive type of ADHD.

Diagnosing Adults with ADHD

Until fairly recently, adults were not thought to have ADHD. Many adults with ongoing symptoms have never been diagnosed. They grew up struggling with problems of attention, organization, poor performance, or difficulty with personal relationships. Parents may first recognize their own disorder when their child is diagnosed.

Like children, adults usually complete a screening process first before proceeding to a full evaluation to determine a diagnosis of ADHD. The screening tool for the adult is different than the one for children. It evaluates the adult in terms of their past history, attention span, distractibility, restlessness, impulsivity, organization, negative internal feelings, relational difficulties, anger management, and other parameters. If there is a strong presence of a number of characteristics, there is a strong likelihood of ADHD. The next step is to proceed with a full evaluation.

Adults are diagnosed with ADHD on the basis of their performance at home and at work. Parents should be asked to rate the person's behavior as a child whenever possible. A spouse or roommate can help rate current behaviors. Perhaps the most important part, however, comes from the person describing their own experiences. Many adults later diagnosed with ADHD express frustration that they are not living up to their potential. There is also an internal feeling of restlessness and they are easily bored. Adults with ADHD often seek novelty and excitement. Most adults with ADHD will give examples of being inattentive, overly active, impatient, and disorganized.

When John starts to see some of the same patterns of disorganization, restlessness, and daydreaming in his son, he becomes concerned. The school recommends that John's son be evaluated for ADHD. John begins to wonder if he might have the

disorder, too, when his son is diagnosed with ADHD.

What Causes ADHD?

Despite being one of the best-researched disorders in medicine, the cause of ADHD remains unknown. Many theories have been proposed and researched over the years, but no single cause has been identified.

What is known is that there is a genetic link, as ADHD tends to run in families. At least 1/3 of all fathers who had ADHD in their youth have children with ADHD and the majority of identical twins share the trait. Boys have ADHD more often than girls, outnumbering them about 3 to 1. Girls tend to receive a diagnosis of inattentive ADHD more often than boys.

ADHD frequently occurs along with certain disorders such as Tourette's syndrome, lead poisoning, fetal alcohol syndrome, and retardation.¹⁷

Studies suggest that ADHD is NOT caused by:¹⁸

- Too much TV
- Food allergies
- Excess sugar
- Poor home life
- Poor schools

Are You Sure this is a Real Disorder?

Fearing that the media presentation of ADHD as a myth, fraud, or benign condition is causing thousands of sufferers to not seek treatment, a consortium of international scientists prepared the International Consensus Statement on ADHD in January 2002. Looking at the 20 attached pages of statement supporters is impressive; medical doctors, psychologists, and university professors are all included. Their combined wisdom produced a strong statement. Here are some excerpts:¹⁹

"We cannot overemphasize the point that, as a matter of science, the notion that ADHD does

not exist is simply wrong. All of the major medical associations and government health agencies recognize ADHD as a genuine disorder because the scientific evidence indicating it is so overwhelming.”

“To publish stories that ADHD is a fictitious disorder or merely a conflict between today’s Huckleberry Finns and their caregivers is tantamount to declaring the earth flat, the laws of gravity debatable, and the periodic table in chemistry a fraud. ADHD should be depicted in the media as realistically and accurately as it is depicted in science—as a valid disorder having varied and substantial adverse impact on those who may suffer from it through no fault of their own, or their parents and teachers.”

If you don’t trust a bunch of over-educated PhD’s, there is compelling physical evidence that ADHD is, indeed, a “real” condition. Researchers have identified differences in the MRIs, PET and SPECT scans, EEGs, and the actual brain structure of persons with ADHD. When looked at together, these studies provide compelling evidence that children and adults with ADHD are indeed built differently.

Magnetic Resonance Imaging (MRI) Scans

National Institute of Mental Health (NIMH) researchers found in a 10 year study of boys and girls ages 5-18, that the brain volume of children and adolescents with ADHD are 3-4% smaller than those who do not have the disorder—and that medication is not the cause.²⁰ While the brain development in children with ADHD paralleled those without the disorder, the disparity in brain volume stayed constant. The findings also showed that white matter volume in children with ADHD who received medication was not different from the control group. However, those with ADHD who had never received medication had remarkably smaller white matter volumes than the control group. White matter is a substance called myelin that insulates the nerve fiber, making it more efficient. The fibers that establish long-distance connections between structures within the brain normally develop white matter that thickens as the child grows older. It seems likely, then, that having significantly less white matter volume

will affect those long-distance connections in the brain. The data also revealed that the brains of children with the most severe ADHD symptoms had several areas that were identifiably smaller: the frontal lobes and temporal gray matter, caudate nucleus, and the cerebellum. The volumes of these structures were significantly and negatively correlated with both physician and parent ratings for attention problems and these correlations were for the most part unaffected when adjusted for age of the child.³⁹ This means that the lower the volume of these structures, the more attention problems are noticed by raters, and vice versa.

In the comment section of the original study spurring the NIMH news release referenced in the preceding paragraph, the researchers made an important point. They suggested that because the brain growth curves of children with ADHD seemed to follow the same trajectory as the control group but on a lower track, that it appears that fundamental developmental processes are essentially healthy in ADHD. This further suggests that the symptoms that appear with ADHD reflect a fixed, earlier neurobiological insult or abnormality.²¹

Another researcher used an MRI-based technique called diffusion tensor imaging (DTI) to look at the white matter in children’s brains. DTI looks at water motion along the fibers that connect brain parts. The motion along these fibers was found to be abnormal in the pathways in the frontal cortex, basal ganglia, brain stem, and cerebellum in children with ADHD. The researcher believes that these areas point to a specific circuit in the brain that connects the front of the brain to the back and relates to ADHD symptoms.²²

PET and SPECT Scans

Positron Emission Tomography (PET) scans look at how the brain metabolizes glucose. Areas that are active use more glucose than areas that are inactive. Single Photon Emission Computed Tomography (SPECT) scans look at blood flow rather than glucose metabolism. Active areas of the brain require a greater supply of blood than inactive areas. Patients can be scanned during performance of tasks to see

which areas of their brain need more glucose/blood. It's almost like seeing their brains think.

Patients with ADHD have some areas of their brains that are overactive and others that are underactive when compared to normal control subjects.²³ Studies have found that the caudate nuclei/striatum, frontal lobes, and the posterior periventricular region tend to have lower than normal blood flow and glucose metabolism. These areas of the brain act as a gate to filter out irrelevant stimuli. Because the "gate" is underactive, there is constant, unchecked bombardment of incoming stimuli and the sensory cortices become flooded with distracting information. This flooding effect can be seen on the SPECT scan as high blood flow to areas of the brain that receive vision and sound (the occipital and temporal lobes).²⁴

Some studies show that when the ADHD medication Ritalin is administered, the glucose metabolism and blood flow normalize in the underactive areas of the brain. However, the prefrontal cortex responds to a lesser extent than other areas.^{23, 24}

Quantitative EEG Studies

The standard electroencephalograph (EEG) measures electrical activity in the brain. Quantitative EEG (QEEG) adds computer technology to the old EEG method to produce maps and tables of data which highlight areas of activity that stand out as different from what would be expected.

In children with ADHD, there is a slowing of the brainwaves, most prominently in the frontal regions. If there is a specific reading disability, certain patterns of the QEEG will deviate from normal. Problems that are primarily auditory will show patterns different from those that are visual. QEEG is currently being used in a number of clinics around the world to aid in the assessment of ADHD reading disability and other pediatric disorders.

New Directions in ADHD Diagnosis...

On the horizon is Altoprane®, a radio-imaging agent that binds with high specificity to

Dopamine Transporter (DAT). Studies have been conducted to see if Altoprane® can help with the diagnosis of ADHD. Researchers have found that when Altoprane® is injected, within 10-15 minutes a SPECT image can be obtained that will show the actual number of DATs in the midbrain. Adult subjects with carefully diagnosed ADHD have DATs that are significantly elevated when compared to normal subjects of the same age. It is hoped that Altoprane® will offer a reliable and objective diagnostic procedure that will aid in confirming the diagnosis of biologically-based ADHD.²⁵ Despite the wealth of evidence revealed with research using various diagnostic equipment and procedures, all researchers so far caution that the procedure cannot be used to diagnose ADHD as yet.

Treatment of ADHD

Why even treat ADHD? It's not like cancer or heart disease, which can kill you. While that may be true, there are very serious consequences for those who do not receive adequate treatment. These consequences can include low self-esteem, social and academic failure, suicide, and an increased risk of later anti-social and criminal behavior.²⁶

The Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder looked at a variety of treatment options for ADHD to determine which treatments were the most effective.²⁷ The study looked at four different configurations of treatment:

- A. medication management alone
- B. intensive behavioral treatment alone
- C. medication paired with behavior therapy
- D. routine community treatment

The study found that long-term combination treatments (#C above) and medication management alone (#A above) were superior to behavioral therapy alone and routine community treatment (#B and D above). The study further observed that the combination treatment also had the advantage of lowering the amount of medication needed to successfully treat the ADHD symptoms, compared to the medication-only group. The combined treatment approach

was also superior to medication alone in areas such as anxiety, academic performance, oppositionality, parent-child relations, and social skills.

Successfully treating ADHD requires medical, psychological, and educational intervention, and behavior management. For young children, educating and supporting the parents is key to success with the child's plan of treatment. With older children and adults, helping them to understand how their educational, vocational, and/or personal difficulties relate to their disorder can go a long way in helping the person to realize that they are not lazy, stupid, or crazy (terms sometimes attributed to those with ADHD).

Medications

For most children and adults with ADHD medication is an important part of the treatment plan.

Psychostimulants

Psychostimulants are the most widely used medications for the treatment of ADHD related symptoms. About 80-85% of children respond to stimulants. It is believed that these medications change the levels of transmitter chemicals available to neurotransmitter systems in the brain. These neurotransmitters help the nerve cells to communicate with one another. Stimulants work primarily on the neurotransmitter dopamine.²⁸ For most children and adults, attention span, impulsivity and on-task behavior improve, especially in structured environments such as school. Some also demonstrate an improvement in frustration tolerance, compliance, and even handwriting. Relationships with parents, teachers, and peers may also improve. Many adults report more control and organization in their lives with psychostimulant medication.

There are several different types of psychostimulants that may be used:

Methylphenidate (Brand names: *Ritalin®, *Metadate®, *Methylin®, and *Concerta®, *Daytrana®)

- Concerta® is a once-a-day formula that lasts up to 12 hours.
- Daytrana® is worn as a patch.

Dexmethylphenidate (Brand name Focalin® and Focalin XR®) This medication is chemically related to methylphenidate.

Dextroamphetamine (Brand names: Dexedrine®, Dextrostat®)

Mixed amphetamine compounds (Brand names: Adderall® and Adderall XR®)

Please consult the table below to review length of action and the FDA approved age for medications as of the date of this publication.

Trade Name	Generic Name/ Class	Length of Action	FDA Approved Age
Adderall	Amphetamine	I	≥3 older
Adderall XR	Amphetamine	L	≥6 older
Concerta	Methylphenidate	L	≥6 older
Daytrana	Methylphenidate (transdermal)	*	≥6 older
Dexedrine	Dextroamphetamine	S	≥3 older
Dexedrine spansule	Dextroamphetamine spansule	I	≥6 older
Dextrostat	Dextroamphetamine	S	≥3 older
Focalin	Dexmethylphenidate	I	≥6 older
Focalin XR	Dexmethylphenidate	L	≥6 older
Metadate ER	Methylphenidate	I	≥6 older
Metadate CD	Methylphenidate	L	≥6 older
Methylin	Methylphenidate	S	≥6 older
Methylin ER	Methylphenidate	I	≥6 older
Ritalin	Methylphenidate	S	≥6 older
Ritalin SR	Methylphenidate	I	≥6 older
Ritalin LA	Methylphenidate	L	≥6 older

Key to length of action: S=short-acting, I=intermediate-acting, L=long-acting.
 *Daytrana patch: Effects noticeable within 2 hours of applying patch. Patch should not be worn more than 9 hours.

The specific dose of medication must be determined for each individual. For children, observations are collected from parents and teachers. For adults, significant family members are asked to share their impressions. If one psychostimulant does not work, another will be

tried. Eight out of 10 children improve on one of the various psychostimulant medications. If none of the psychostimulants seem to help, there are unmanageable side-effects, or there is an accompanying disorder, other medications, such as Strattera®, (discussed next) may be used.

Common side effects of all stimulants may include decreased appetite, sleep problems, headaches, stomach upset, increased irritability/jitteriness/anxiety.^{28, 33} All stimulants have the potential to be addictive.

Less common side effects include dry mouth, dizziness, rebound effect (hyperactivity and/or irritability as the medication wears off), and transient tics.²⁸

Very rare side effects include stuttering, increased blood pressure or heart rate, and growth delay.²⁸

Most side effects can be managed by either lowering the dose, adjusting the medication schedule, using a different stimulant, perhaps using an adjunct medication.^{28, 33} Patients and parents will need to work with the prescribing physician to find the right medication and dosage.

Strattera® (Atomoxetine)

Strattera® is a newer medication that is FDA approved for the treatment of ADHD in adults and children 6 and older. Strattera® is not a stimulant. It works primarily on the neurotransmitter norepinephrine. Strattera® needs to be taken every day and stays in body for 24 hours. It takes several weeks for Strattera® to work. This is different than a stimulant, which can be stopped and started at any time and works the day it is taken. Strattera® is not addictive.

The most common side effects of Strattera® are sleepiness and nausea. This medicine may also cause dizziness. Alcohol, hot weather, exercise and fever can make the dizziness worse. To minimize dizziness, patients should be instructed to sit or stand up slowly, especially in the morning. This medication may also affect growth rate in children. Growth should be

checked regularly in children on this medication, especially if they experience weight loss and decreased appetite. This medicine increases the risk of suicidal thoughts in children and adolescents. Children and adolescents prescribed this medication should be observed closely during the first few months of treatment.

Antidepressants

While psychostimulants are the first-line drugs of choice in the treatment of uncomplicated ADHD in all age groups, antidepressants (tricyclic antidepressants [TCAs] and bupropion) are recommended as second-line treatment for juvenile patients who do not respond to stimulants or for patients with concurrent psychiatric disorders. Individuals who have partial responses to medication or psychiatric comorbidity may require multiple agents.^{34, 35}

The tricyclic antidepressants, especially imipramine (trade name Tofranil®) and desipramine (trade names Norpramin®, Pertofrane®), are the second most studied medications in the treatment of ADHD (stimulants have been studied the most). Almost all of the studies (93%) reported at least a moderate improvement of ADHD symptoms and that the improvement can be maintained with dosing that is titrated upward over time.³⁴

Most TCAs affect the neurotransmitters norepinephrine and serotonin. Bupropion (Wellbutrin®, Zyban®) has a pharmacological action that is distinctly different from other antidepressants. It has both indirect dopamine and noradrenergic agonist effects but its specific mechanism of action is unknown. Bupropion appears to have a rapid and sustained effect on ADHD symptoms.³⁴ Bupropion may be used as a first-line drug of choice for complex ADHD patients with substance abuse or an unstable mood disorder.³⁵

Common side-effects to tricyclic antidepressants include dry mouth, constipation, sexual problems, blurred vision, dizziness, increased heart rate and ECG intervals, and daytime drowsiness.

Newer antidepressants, including SSRIs (selective serotonin reuptake inhibitors; tradenames Prozac®, Zoloft®, Luvox®, Paxil®, and Celexa®) have different side effects including headache, nausea, insomnia, nervousness, sexual side-effects, and agitation. Side-effects need to be weighed against the benefits obtained.

Other antidepressants such as Prozac® (fluoxetine), Paxil® (paroxetine), Zoloft® (sertraline), Celexa® (citalopram) and others may be prescribed to treat a comorbid depression with ADHD. With the exception of the TCAs and bupropion, most antidepressants do not treat ADHD symptoms.

Unlike psychostimulants, antidepressants often cannot be discontinued abruptly—they usually need to be tapered.

Antihypertensives

Clonidine (Catapres®), guanfacine (Tenex®), and propranolol (Inderal®), drugs normally used to treat hypertension, are used to treat tic disorders, ADHD, and sleep problems. These medications may reduce aggressiveness, severe outbursts, and self-injurious behavior. They are frequently used in combination with other drugs such as stimulants, mood stabilizers, and antidepressants.³⁶

Because abrupt withdrawal of an antihypertensive can cause a rebound upward swing in blood pressure, it should be tapered slowly.

Polypharmacy

Many physicians, in both medical and psychiatric practices, use multiple agents to treat illnesses. Doctors use more than one medication for the following reasons:

- Comorbidity (disorders that occur together, such as ADHD and depression)
- A single medication doesn't adequately cover the problem
- Synergism (medications that achieve an effect together that cannot be achieved alone)

- To treat the side-effects of an effective medication

With ADHD, particularly if there are comorbid conditions, it is not uncommon for patients to take more than one type of medicine.

Education About Medications

Because medication changes are most often made on the basis of parent and/or patient report, they need to be well informed about their medicine(s). Common decisions that parents and/or patients need to make with their physicians include:

- Is the current medicine dosage doing enough to control ADHD symptoms?
- Which type of medicine (short versus long-acting) does the best job of controlling symptoms and keeping the patient on an even keel over the course of a normal day?
- Is there need for supplemental medication, given only when needed, to cover important activities (evening activities such as Scouting or sports, homework, etc.)?
- Are other medications needed (i.e., antidepressants, etc.)?
- Does the timing of the medication fit into the patient's life? Is it interfering with sleep?

Brandon had several medication changes to find the most effective means of controlling his ADHD symptoms. He is currently on a twice a day dose of methylphenidate. He suffered from a decrease in appetite and tummy ache initially but now is eating well. While Brandon is more under control in terms of hyperactivity and aggression, he still does not have any friends at school or in the neighborhood. Brandon's parents wonder what else they can do to help Brandon.

Sarah started on a twice a day preparation of Ritalin® but quickly changed to a sustained release preparation because she was having "mini-meltdowns" when her medication wore off. Even though Sarah's medication has improved her ability to concentrate, she continues to be disorganized in daily life and was very

depressed. She recently started on an anti-depressant and is in much better spirits.

John decided to talk with his physician about his suspicions of ADHD. John was evaluated and found to have the disorder. John reluctantly decided to try methylphenidate to see if it would help him with his job. Although John could not quite put his finger on exactly why work got easier once the medication was started, the fact of the matter is that it did. John is currently working as a garage mechanic and things seem to be going well at work.

Controversial Treatments

The following treatments have not been scientifically shown to be effective in treating ADHD in the majority of children and adults.³⁷

- Biofeedback
- Restricted diets
- Allergy treatments
- Medicines to correct inner ear problems
- Megavitamins
- Chiropractic adjustment and bone re-alignment
- Treatment for yeast infection
- Eye training
- Special colored glasses

Recommended Treatments for ADHD

To effectively treat ADHD, interventions need to occur at multiple levels:

- Medication
- School interventions
- Psychotherapy
- Parent skills training (behavior management)
- Support groups
- Social skills training
- Parent and patient education

Medical/Psychological Intervention

A personal physician who has experience with ADHD is important for managing medications, monitoring for potential side-effects, and optimizing general health status. Typically, the physician will want to see patients every 6 months to monitor for therapeutic and side-effects. The interval between visits may be longer or shorter than 6 months depending on the individual case. Many types of physicians care for ADHD patients including family physicians, pediatricians, internists, neurologists, and psychiatrists. These types of physicians are qualified to diagnose and prescribe medication for ADHD. Psychiatrists are also qualified to provide counseling. Specially trained psychologists in Louisiana and New Mexico are qualified to prescribe medication for ADHD.³⁸ In several states (including Minnesota) specially trained clinical nurse specialists/nurse practitioners are qualified to prescribe medications for ADHD and monitor for side-effects.

Psychotherapy provided by a psychologist, psychiatrist, clinical nurse specialist, and/or social worker can be very valuable to patients and parents. Patients are encouraged to explore upsetting thoughts and feelings, address self-defeating patterns of behavior, and to learn alternative ways to handle their emotions and situations. Psychotherapy is also beneficial to parents. It can help parents understand the disorder better and explore ways in which they can help their child and deal with day to day problems.

School Interventions

Children with ADHD often need special accommodations to help them learn. Parents will need to interact with teachers, the school psychologist and nurse, and/or other staff to design a positive learning environment for their child. Many children with ADHD are able to receive special education services under the Individuals with Disabilities Education Act (IDEA). If children do not qualify under IDEA, they can receive help under the National Rehabilitation Act, Section 504 (504 eligibility). the public schools. The special education teacher, classroom teacher, parents, and other

school staff will work together to assess the child's strengths and challenges and design an Individualized Education Plan (IEP). The IEP outlines specific skills the child needs to develop as well as learning activities to develop those skills. A number of educational strategies should be tried to address the challenges of a student with ADHD.

Behavior Management

Life can be difficult with ADHD. Parents can have a hard time of it when their child is full of uncontrolled energy, leaving messes, throwing tantrums, and not listening or following directions. The usual methods of discipline don't work. Parents feel at a loss and often blame themselves for not being better parents.

Children with ADHD also have it tough. They may spend many agonizing hours on their homework each night, only to forget to bring it or turn it in. They often have difficulty getting along with other children and may not have any friends.

While medication can help to control some of the behavior problems of ADHD, there are other aspects of the problem that medication may not help. By the time a child or adult has been diagnosed with ADHD, cycles of frustration, anger, and blame have become so firmly entrenched it takes some time to undo. A psychotherapist can be very helpful in teaching children and adults to feel better about themselves, cope with daily problems, and control their attention and aggression.

Children and adults with ADHD greatly benefit from structure. Most often the parents provide this structure for the child and they soon learn how to change situations so that their child can succeed. The best behavioral management techniques are consistency and positive reinforcement. Some other things that can help manage behavior include:

- Reducing stimulation
- Planning transitions
- Dividing larger tasks into smaller steps, praise when each step is completed

- Providing a system of rewards and, if needed, punishment. Punishment should fit the situation and, if at all possible, be a direct result of their behavior (i.e., forgot assignment at home so they have to stay in from recess to finish). Rewards tend to be more effective than punishments over the long haul
- Communicating with short, clear messages that are repeated frequently
- Developing consistent routines
- Avoiding complicated sets of rules—use a few firm rules and stick to them
- Targeting one or two important behaviors to work on, let the rest go for now
- Teaching them how to recognize internal cues of frustration and what to do about it
- Giving them alternative (acceptable) ways of acting; praise when an acceptable way is chosen

Parents can think of behavioral management techniques as tools for their toolbox. The tools that worked yesterday may not work today, so you need to have a lot of tools. If one thing isn't working, try something else. Continually look for new tools to add to the toolbox. Parent support groups, books, and psychotherapy are all good sources for new ideas.

Social Skills Problems

Children and adults with ADHD often have social difficulties. They may not track topics of conversation very well and go off on tangents. They tend to be inattentive to social cues and can be impulsive in ways that don't build good social relationships (cut in line, blurt out answers, cut in on others when they are talking, not taking turns, etc.). They may also make negative or accusatory comments to peers and be too aggressive during play. While these problems may not seem very important compared to a life-threatening condition, they do impact tremendously on one's self esteem, happiness, and relationships.

While most kids tend to pick up social skills as they grow, children with ADHD are sometimes clueless about the most basic of skills. Social skills will need to be taught and reinforced to

make progress in this area. Parents can help children by teaching them:

- What is appropriate behavior (taking turns, sharing, etc.)
- Why it's important to follow social norms
- How to "read" other people's facial expressions, body language, and tone of voice
- To look at a person's choice of words ("I'd love to go" means *Yes!*; "Probably" means *I'd rather not, but will do it anyway*)
- To ask for help early, before they get extremely frustrated
- How to make a friend/keep a friend
- Age-appropriate behaviors
- How to respond to teasing
- How to interpret polite behavior—it often disguises true feelings

Parents should model important skills, such as sportsmanship, and may want to role-play potentially emotional situations with their child. Try to make game playing a fun time but insist on fair play in terms of turn-taking and rule-following.

Parents can also help their child with listening and reciprocal communication. Reciprocal communication is conversational, where each person takes turns listening and responding. Explain the importance of allowing the other person to finish their thought, rather than interrupting. As their child gets older, teach them to ask questions relevant to what the other person has said, rather than just making statements about themselves. Work on one or two goals at a time and give immediate reinforcement for the use of appropriate social skills. ADHD children need immediate rewards because the long-term reward of having friends will be slow in coming.

Parents and teachers can also do a bit of "social engineering" to increase the child's chance of success and sense of belonging. Match them up with children that are older, younger, or may be looking for a friend (tend to have more trouble with children of the same age). Play situations work better with one friend at a time and for short periods of time. Place them in small groups

with lots of adult supervision and in situations where cooperation, rather than competition, is emphasized. Verbalize the child's strengths and find a way to showcase their talents.

Long Term Prognosis

Even though most people don't outgrow ADHD, they do learn to adapt and can live very fulfilling lives. Proper treatment with medication, skills development, and emotional support all help those with ADHD to minimize disruptive behaviors and control attention. People with ADHD tend to be ready for action and many choose work that gives them the freedom to move around and release excess energy. Because of their ability to think about many things at once, many have become successful artists and inventors.

Resources are available to help young adults with their career goals. Teens with ADHD should not be afraid to consider college. Schools that receive federal funds must furnish special supports for students with learning problems (Section 504). Students can tap into these supports to extend test time, use a calculator, use a laptop for composition, and other adaptations.

Conclusion

Brandon, Sarah, and John all have improved their daily lives by seeking treatment. Brandon has made a friend with another little boy who also has ADHD. He is managing school fairly well with the help and support of his parents and teacher. Sarah has found weekly visits with the school psychologist to be extremely helpful. She now recognizes that what is "wrong with her" is a condition that she is learning to manage. John has found that he is not lazy or stupid, names that he had heard applied to him throughout his developing years. John is committed to getting treatment for both himself and his son, so that his son does not grow up believing such things about himself.

Given the proper intervention and support, children with ADHD can, indeed, grow up to be

successful adults. Adults with the disorder can also benefit from treatment. Encourage parents and patients to pursue the interventions, adaptations, and supports that they need.

References

Due to the temporary nature of information on the internet, some website references may no longer be available. Printouts of online references are kept on file in the TCHP office.

1. Zeigler Dendy, C. (1995). Teenagers with ADD: A parent's guide. Woodbine House, Bethesda, MD, p. 12.
2. Zeigler Dendy, C. (1995). Teenagers with ADD: A parent's guide. Woodbine House, Bethesda, MD, p. 1.
3. CHADD Facts (2001). Page 1. Available online at: www.chadd.org/facts/add_facts01.htm.
4. American Psychiatric Association (1994). Diagnostic and statistical manual of mental disorders, 4th ed., Washington, D.C.: PA.
5. Wilens, T. (1988). AOD use and attention deficit/hyperactivity disorder. Alcohol Health and Research World, 22(2), 127-130.
6. American Academy of Pediatrics (May 2000). Pediatrics, 105(15), p. 1166.
7. National Institute of Mental Health (2006). Attention Deficit Hyperactivity Disorder. Available online at www.nimh.nih.gov (accessed 2/27/07), page 8.
8. American Academy of Child and Adolescent Psychiatry (July 2004). Conduct disorder. Available on line at www.aacap.org (accessed 3/4/2007), page 2.
9. CHADD Facts (2001). Page 3. Available online at: www.chadd.org/facts/add_facts05.htm.
10. Zeigler Dendy, C. (1995). Teenagers with ADD: A parent's guide. Woodbine House, Bethesda, MD, p. 45.
11. CHADD Facts (2001). Page 2. Available online at: www.chadd.org/facts/add_facts05.htm.
12. Zeigler Dendy, C. (1995). Teenagers with ADD: A parent's guide. Woodbine House, Bethesda, MD, p. 193.
13. Wilens, T., Faraone, S., Biederman, J., and Gunawardene, S. (January 2003). Does stimulant therapy of attention-deficit/hyperactivity disorder beget later substance abuse? Pediatrics 111:1, page 182.
14. National Institute of Mental Health (April, 2000). Attention deficit hyperactivity disorder (ADHD): Questions and answers, p.4-5. Available online at www.nih.gov/publicat/adhdqa.
15. CHADD Facts (2001). Page 3-4. Available online: www.chadd.org/facts/add_facts05.htm.
16. Wilens, T., Faraone, S., Biederman, J., and Gunawardene, S. (January 2003). Does stimulant therapy of attention-deficit/hyperactivity disorder beget later substance abuse? Pediatrics 111:1, page 183.
17. Leutwyler, K. (Aug., 1996). Paying attention. Scientific American. Available online at: www.scientificamerican.com, page 3.
18. Neuwirth, S. (1994). Decade of the brain. National Institute of Mental Health, p. 7 Available online at: www.concentric.net.
19. International consensus Statement on ADHD (January 2002). *Clinical Child and Family Psychology Review*, 5(2), p. 89-93.
20. Brain Shrinkage in ADHD Not Caused by Medications (October 8, 2002). NIH News Release. Available online at www.nih.gov/news/pr/oct2002/nimh-08.htm

21. Castellanos, F., et.al., (October 2002). Developmental trajectories of brain volume abnormalities in children and adolescents with attention-deficit/ hyperactivity disorder. *Journal of the American Medical Association* 288:14, 1747.
22. Ashari, M. (2004). Brain circuitry and ADHD. This research was presented to the 2004 annual meeting of the Radiological Society of North America and was funded by the NIMH. Review available online at: www.sciencentral.com/articles (accessed 3/14/07).
23. Goodwin, S., Ovnicek, K., and Korschun, H. (1988). How ritalin enhances memory: Clues provided by brain scans of ADHD patients using the drug. Emory University, p. 1-3. Available online at: www.emory.org.
24. Green, C. and Chee, K. (1997). Brain image scanning and mapping with ADHD: An overview, p. 3. Available online at: www.itinternet.com/~black.ice/addnet/scan.html.
25. Altropane®: A radio-imaging agent for the objective diagnosis of attention deficit hyperactivity disorder (ADHD), p. 1-2. Available online: www.bostonlifesciences.com.
26. CHADD Facts (2001). Page 1. Available online at: www.chadd.org/facts/add_facts03.htm.
27. The MTA Cooperative Group. A 14-month randomized clinical trial of treatment strategies for attention-deficit hyperactivity disorder (ADHD). *Archives of General Psychiatry*, 1999; 56:1073-1086.
28. American Academy of Pediatrics (accessed 2/27/07). ADHD—Treatment with medication, page 2. Available online at www.aap.org/pubed/ADHDMeds.htm.
29. National Institute of Mental Health (2006). Attention Deficit Hyperactivity Disorder. Available online at www.nimh.nih.gov (accessed 2/27/07), page 10.
30. National Institute of Mental Health (2007). Medications. Available online at www.nimh.nih.gov/publicat/medicate.cfm (accessed 2/27/07), page 16.
31. Daytrana (10/3/2006). Available online at www.drugs.com/daytrana.html. (accessed 3/5/07).
32. Doctor's Guide (5/16/00) FDA approves extended release Methylphenidate (methylphenidate) for attention deficit hyperactivity disorder. Available online at www.docguide.com (accessed 3/5/07).
33. National Institute of Mental Health (2006). Attention Deficit Hyperactivity Disorder. Available online at www.nimh.nih.gov (accessed 2/27/07), page 11.
34. Biederman, J. (1998). Attention-deficit/hyperactivity disorder: A life-span perspective. *Journal of Clinical Psychiatry*, 1998;59 (supplement 7), p. 4-16.
35. Wilens, T. (2007). Available on the American Academy of Child and Adolescent Psychiatry website. New Advances in the Psychopharmacological Treatment of Attention-Deficit/Hyperactivity Disorder. Available on line at www.aacap.org (accessed 3/4/2007), page 2.
36. Wilens, T. (2001). Straight talk about psychiatric medications for kids. Guilford Press, NY, NY, p. 228.
37. Neuwirth, S. (1994). Decade of the brain. *National Institute of Mental Health*, p. 19 Available online at: www.concentric.net.
38. National Institute of Mental Health (2006). Attention Deficit Hyperactivity Disorder. Available online at www.nimh.nih.gov (accessed 2/27/07), page 4.
39. Castellanos, F., et.al., (October 2002). Developmental trajectories of brain volume

abnormalities in children and adolescents with attention-deficit/ hyperactivity disorder. *Journal of the American Medical Association* 288:14, 1745.

40. McGough, Pataki, C., and Suddath, R. (July 2005). Dexamethylphenidate extended-release capsules for attention deficit hyperactivity disorder. *Future Drugs*, 5:4, 437-441. Summary available online at www.future-drugs.com or on Pubmed.
41. Arnold, L., et. al. (Winter, 2004). A double-blind, placebo-controlled withdrawal trial of dexamethylphenidate hydrochloride in children with attention deficit hyperactivity disorder. *Journal of Child Adolescent Psychopharmacology*, 14(4): 542-54. Summary available online in Pubmed., PMID: 15662146.

Resources/Suggested Reading

The number of resources available is too numerous to mention everything. Many bookstores have a section devoted to kids with special needs. Amazon.com has a large number of books on ADHD, including self-help books for adults with the disorder, books for teens and for those going to college. There are a couple things listed here that you might find helpful. The first three books would be good references for patients and their families.

1. Hallowell, E. and Ratey, J. (March 1995). *Driven to Distraction*. Simon and Schuster, NY, NY.
2. Kelly, K., Ramundo, P., and Silver, L. (January 1996). *You Mean I'm Not Lazy, Stupid, or Crazy?* Simon and Schuster, NY, NY.
3. Zeigler Dendy, C. (1995). *Teenagers with ADD: A parent's guide*. Woodbine House, Bethesda, MD.

4. www.help4adhd.org. This website has lots of information on ADHD including help with social skills.
5. Screening tool for children: www.psychtreatment.com/adhd.htm
6. Screening tool for adults: [www.alliedpsychological.com/Adult ADH D Screening.htm](http://www.alliedpsychological.com/Adult_ADH_D_Screening.htm).
7. Wilens, T. (2001). *Straight talk about psychiatric medications for kids*. Guilford Press, NY, NY.

Directions for Submitting Your Post Test for Contact Hours

To obtain a certificate of completion for this home study program, please complete the post-test and evaluation on the next few pages. The date on your certificate of completion will be the date that your home study is received. **Any materials received with a postmark after the expiration will be discarded.**

HealthEast, HCMC, & MVAMC Employees

If you are an employee of HealthEast, HCMC, or MVAMC, you may send the post-test and evaluation to TCHP for processing. Your post-test will be returned to you through your hospital. It cannot be mailed to your home.

Paid Participants

If you are not an employee of one of the TCHP hospitals, please send the post-test and evaluation to TCHP with a check for \$12.00. Please make check payable to **TCHP Education Consortium** and mail to:

TCHP Education Consortium
Capitol Office Building
525 Park Street, Suite 120
St. Paul, MN 55103

Your post-test will be returned to you with the certificate of completion.

Attention Deficit Hyperactivity Disorder Post-Test

Please print all information clearly and sign the verification statement:

Name _____
(please print legal name above)

Birth date (required)

Format: 01/03/1999

M	M	D	D	Y	Y	Y	Y

*For HealthEast, HCMC, or MVAMC,
employees only:*

Hospital _____ Unit _____

Personal verification of successful completion of this educational activity (required):

*I verify that I have read this home study and
have completed the post-test and evaluation.*

Signature

1. What percentage of patients fall into the ADHD combined subtype?
 - a) 5-10%
 - b) 75%
 - c) 50%
 - d) 15-20%
2. Which of the following disorders is NOT a comorbid condition with ADHD?
 - a) Conduct disorder
 - b) Learning disability
 - c) Tourette's syndrome
 - d) Asthma
3. Which of the following is NOT a routine part of the comprehensive examination to diagnose ADHD?
 - a) Hearing and vision tests
 - b) EEG
 - c) Medical examination
 - d) Careful history
4. True or false? For a diagnosis of ADHD, symptoms must occur early in life, before age 7 and continue for at least 6 months.
5. True or false? The cause of ADHD is unknown.
6. Which of the following types of medication might be used to treat ADHD symptoms?
 - a) Antihypertensives
 - b) Psychostimulants
 - c) Tricyclic antidepressants
 - d) All of the above
7. True or false? The best behavioral management techniques are consistency and positive reinforcement.
8. Which of the following is a recommended part of the treatment plan for ADHD?
 - a) Eliminating sugar from the diet
 - b) Medication
 - c) Psychotherapy
 - d) Biofeedback
 - e) B & C only
 - f) A, B, & C
9. True or false? Social skills problems resolve when the child is placed on medication.
10. True or false? Special supports are available at the college level for those with ADHD, as long as the school receives federal funding.
11. True or false? Most people outgrow ADHD.

Expiration date: The last day that post tests will be accepted for this edition is **December 31, 2017**—your envelope must be postmarked on or before that day.

Evaluation: Attention Deficit/ Hyperactivity Disorder

Please complete the evaluation form below by placing an “X” in the box that best fits your evaluation of this educational activity. Completion of this form is required to successfully complete the activity and be awarded contact hours.

At the end of this home study program, I am able to:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Describe behavior that may indicate ADHD.					
2. Identify co-morbid disorders to ADHD					
3. Identify 2 or more medications used to treat ADHD.					
4. Describe other elements, besides medication, that should be included in the plan of treatment for ADHD.					
5. The teaching / learning resources were effective. <i>If not, please comment:</i>					

The following were disclosed in writing prior to, or at the start of, this educational activity (please refer to the first 2 pages of the booklet).		
	Yes	No
6. Notice of requirements for successful completion, including purpose and objectives		
7. Conflict of interest		
8. Disclosure of relevant financial relationships and mechanism to identify and resolve conflicts of interest		
9. Sponsorship or commercial support		
10. Non-endorsement of products		
11. Off-label use		
12. Expiration Date for Awarding Contact Hours		
13. Did you, as a participant, notice any bias in this educational activity that was not previously disclosed? <i>If yes, please describe the nature of the bias:</i>		

14. How long did it take you to read this home study and complete the post test and evaluation:
 _____ hours and _____ minutes.

15. Did you feel that the number of contact hours offered for this educational activity was appropriate for the amount of time you spent on it?

___ Yes

___ No, more contact hours should have been offered

___ No, fewer contact hours should have been offered.

Expiration date: December 31, 2017
