

Psychiatry

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POSTGRADUATE EDUCATION
NEWSLETTER

MAY 2003

2003 Upcoming Courses

Psychiatry: A Comprehensive Update and Board Preparation

Monday-Saturday, September 15-20, 2003
The Westin Hotel, Copley Place, Boston

Psychopharmacology

Thursday-Saturday, October 16-18, 2003
The Westin Hotel, Copley Place, Boston

Home Study on Audio Cassettes

Psychiatric Neuroscience: A Primer for Clinicians

Psychopharmacology

Child and Adolescent Psychopharmacology

FOR MORE INFORMATION:

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Attention Deficit Hyperactivity Disorder Across the Life Span

March 7-9, 2003

COURSE DIRECTORS:

Jerrold F. Rosenbaum, M.D., Joseph Biederman, M.D., Stephen V. Faraone, Ph.D., Thomas J. Spencer, M.D., Timothy E. Wilens, M.D., and John B. Herman, M.D.

COURSE ADMINISTRATIVE STAFF:

Gail E. Dickson, M.P.A., Stephanie Lipka Hackett, Arlene Lietz, and Katherine Pike, L.C.S.W.

Renowned for straightforward teaching of state-of-the-art psychiatry to practicing clinicians, the Massachusetts General Hospital (MGH) Department of Psychiatry sends this e-newsletter to our friends and colleagues, nearby and around the world. It prints out nicely, or can be read "on-line."

For those who were unable to journey to this course in Boston, it is intended as an update and "taste." For those who were able to join us, we hope this newsletter will provide a useful summary. Please let us know what you think. If you are interested in being included in this mailing list, please respond to: PsychiatryPostgraduateEdu@partners.org

Here's to a long life of learning!

The MGH Pediatric Psychopharmacology Unit, headed by Dr. Joseph Biederman, is a pioneer in the field. This state-of-the-art course has earned exceptional acclaim since its first offering in 1997. Rivaling progress in adult psychopharmacology, the field of pediatric psychopharmacology continues to advance rapidly. Treatment of attention deficit hyperactivity disorder (ADHD) has gained widespread acceptance. Recent research findings relevant to clinical practice were presented by MGH ADHD clinician-researchers as well as by distinguished guest ADHD experts.

Each of the approximately 400 attendees of this of this three-day continuing education course (held at the Westin Hotel, Copley Place, Boston, MA, 02116) received a comprehensive syllabus. Continuing Medical Education (CME) certificates were provided for physicians, psychologists, social workers, and nurses. A sample of selected (and annotated) references, which report on the results of clinical trials and review the literature in a field, is provided below.



Here are some facts from the MGH's **Attention Deficit Hyperactivity Disorder: Across the Life Span** Course:

DEFINITIONS AND OVERVIEW OF ADHD

Joseph Biederman, M.D.

Dr. Biederman presented an exciting, data-driven, and systematic review of the symptoms (including inattention and impulsivity/hyperactivity), the genetics, and the neuroanatomic correlates of Attention Deficit Hyperactivity Disorder (ADHD). He emphasized that ADHD is both prevalent and problematic. Dr. Biederman also noted that:

- ADHD is a heterogeneous behavioral disorder with multiple etiologies (neuroanatomical, neurochemical, genetic, and environmental).
- ADHD comprises a deficit in behavioral inhibition.
- Neural networks of attention involve the prefrontal and parietal cortex, the cingulate gyrus, the limbic system, the basal ganglia, the thalamus, and the brainstem.
- Symptoms of inattention include seeming not to listen, avoiding tasks requiring sustained attention, losing things, being easily distractible, and failing to finish tasks.
- Symptoms of ADHD vary in pervasiveness, frequency of occurrence, and degree of impairment.
- Symptoms of impulsivity/hyperactivity include blurting out answers before a question is finished, having difficulty awaiting one's turn, interrupting others, being unable to stay seated, running/climbing inappropriately, having difficulty engaging in leisure activities quietly, and talking excessively.
- Even preschoolers (age 4-6) can be diagnosed as having ADHD.
- The most common type of ADHD is the combined type, which includes inattention-impulsivity/hyperactivity.
- Significantly more drivers of motor vehicles drive without a license have their licenses revoked or suspended, have had multiple crashes, and had multiple traffic citations.
- Interestingly, an abnormality in frontal-striatal connections has been observed in ADHD.
- Brain imaging has revealed a smaller right basal ganglia, corpus callosum, and frontal area in those with ADHD.

- A great deal of neurologic research on ADHD has focussed on dopaminergic pathways.
- Abnormalities in the dopamine transporter gene DAT1 on chromosome 5 and the D4 receptor on the 7 repeat allele on chromosome 11 have been associated with ADHD.
- The neurobiology of ADHD may involve deficits in cholinergic nicotinic receptors.
- There is a highly significant association between maternal smoking during pregnancy and ADHD in the offspring.
- Individuals with ADHD receiving medication for ADHD have a lower incidence of substance abuse than those with unmedicated ADHD.
- Unmedicated adolescents with ADHD have an increased risk of substance abuse throughout adulthood.
- Heritability for ADHD is about 80%.
- ADHD occurs equally in boys and girls.
- Boys with ADHD tend to have more learning disabilities than girls have disabilities.
- ADHD is commonly comorbid with mood, anxiety, and conduct disorders.
- Neuropsychological testing has limited diagnostic utility in ADHD.
- Risk factors for ADHD are a family history of ADHD, other psychiatric disorders, and psychosocial adversity.
- The times of higher risk of substance use disorder in ADHD are late adolescence and the adult years.

GENETICS OF ADHD

Stephen V. Faraone, Ph.D.

The question, why is psychiatric genetics relevant to psychopharmacology was addressed by Stephen Faraone, Ph.D. He described how one determines whether a disorder is familial and clarified what the relative contribution of genes and environment are to a disease, and how genes influence susceptibility to illness. Moreover, he discussed which mechanisms cause disease pathophysiology. Dr. Faraone also discussed what genes influence drug response, and suggested how we can use genetic data to test primary prevention strategies. Specifically, Dr. Faraone noted that:



- Both genes and the environment contribute to the etiology of ADHD.
- If a disorder has a genetic etiology, then relatives of ADHD patients should be more likely to have ADHD than relatives of non-ADHD patients.
- ADHD runs in families.
- 20% of first-degree relatives of children with ADHD also have the disorder.
- Identical or monozygotic twins have 100% of their genes in common.
- Fraternal or dizygotic twins, like siblings, share 50% of their genes.
- Differences between dizygotic twins could be due to either genetic or environmental influences.
- Children adopted at an early age have a genetic relationship to biological parents and an environmental relationship to adoptive parents.
- If genes are important in ADHD, then the transmission of ADHD should occur in the biological, not the adoptive, family.
- If environmental transmission causes ADHD, then familial transmission occurs in the adoptive, but not the biological family.
- Genes make youth susceptible to psychiatric disorders.
- Twin studies of ADHD suggest that ADHD is highly heritable; in addition, environmental factors play a role.
- Both clinical and population-based studies show that ADHD is highly comorbid with antisocial, mood, anxiety, and learning disorders.
- Genes control brain systems that mediate therapeutic response and side effects.
- The 480 allele of the dopamine transporter gene (DAT) is associated with ADHD.
- The distribution of DRD4 mRNA in brain suggests its role in cognitive and emotional functioning.
- At this point ADHD is a clinical diagnosis that cannot be made by any genetic test.

NEUROIMAGING OF ADHD

George Bush, M.D., M.M.Sc.

Dr. Bush's presentation was laced with humor that reflected the similarity of his name to those of the current, and a former, President of the USA. With a rapid talking style, he joked about "the tendency of stupid ideas to seem smart when they come out rapidly." Graphically intense, Dr. Bush's lecture highlighted current neuroimaging techniques and made their methodology understandable to all in attendance. Dr. Bush noted:

- Methodological issues are paramount to a sound understanding of neuroimaging studies.
- One must be mindful of sample selection, imaging methods, and the relationship to behavioral measures, to anatomy, and to physiology.
- Neuroimaging tests include SPECT (single photon emission computerized tomography), PET (positron emission tomography), and fMRI (functional magnetic resonance imaging).
- According to neuroimaging studies fronto-striatal circuitry is probably dysfunctional in patients with ADHD.
- A decrease in the size of the prefrontal cortex, caudate, globus pallidus, putamen, and cerebellum has been found in ADHD patients.
- The anterior cingulate cortex fails to activate during cognitive tasks in ADHD.
- Anticipation, attention, novelty detection, working memory, error-detection and reward-based decision-making are functions that are regulated by the dorsal anterior cingulate cortex.
- Use of methylphenidate appears to increase activation of the DLPFC (dorsolateral prefrontal cortex).
- Use of cognitive and emotional counting Stroop tests appear to activate subdivisions of the anterior cingulate gyrus.



ADHD AND TOURETTE'S DISORDER

Barbara J. Coffey, M.D., M.S.

Dr. Coffey presented an historical overview of tics and Tourette's disorders and then reviewed the diagnostic criteria, the clinical course, epidemiological findings, reports of genetic linkages, and recent neuroanatomical and neuroimaging findings. Pharmacotherapy, (e.g., with guanfacine, TCAs, stimulants, neuroleptics, SSRIs, and baclofen) was discussed at length, and special consideration was given to algorithmic approaches to those with comorbid diagnoses. Specific facts related to tics and Tourette's disorder include:

- Transient tic disorder is the most common disorder among youths.
- Tourette's disorder (TD) likely involves a diffuse process in the cortico-thalamic striatum.
- The mean age of onset of TD is 6-7 years; its peak is from 10-11 years.
- Tourette's disorder is frequently comorbid with OCD, ADHD, anxiety, and depression.
- Tics of TD occur many times a day, nearly every day or intermittently throughout a period of more than a year and during this period there is never a tic-free period lasting more than three consecutive months.
- Tic disorders are not associated with stimulant use.
- About 15-20% of school-age children have transient tics and 10-30% of children with ADHD have tics.
- The lifetime prevalence of TD is 1-10/1000.
- Males are at least three to four times more likely than females to manifest TD.
- TD is usually life-long, although periods of remission may last weeks to years.
- At least 40-50% of TD patients also have ADHD symptoms (hyperactivity, impulsivity, and distractibility).
- Youth and adults with ADHD with tics tend to experience a reduction or complete remission of tics over time.
- Previous treatment with stimulants does not alter the onset or offset of tics.
- The etiology and pathophysiology of TD and tic disorders are unknown; however, dopamine, serotonin, and endogenous opioids have been implicated.

- The neurobiology of TD involves cortico-striato-thalamo-cortical pathways in the basal ganglia, striatum, and frontal lobes.
- Agents found helpful in TD include clonidine (an alpha-2 adrenergic agonist), guanfacine (an alpha-2 adrenergic agonist), tricyclic antidepressants, stimulants, and neuroleptics.
- Patients with mild or moderate tics may not need treatment.

PATTERNS OF COMORBIDITY IN ADHD AND GENDER DIFFERENCES

Joseph Biederman, M.D.

Dr. Biederman, a mentor to scores of clinician-researchers, demonstrated once again his command of the literature regarding ADHD and related disorders. Highlights from his presentation included:

- ADHD is more prevalent in boys than it is in girls; the male: female ratio is 5:1.
- Conduct disorders are more common in boys than girls.
- Girls with ADHD appear to have greater intellectual impairments, lower rates of conduct disorder and hyperactivity, and higher rates of mood and anxiety disorders than boys with ADHD.
- Nonetheless, girls with ADHD may go unidentified and untreated - a finding that may have substantial mental health and educational implications.
- ADHD is frequently comorbid with conduct disorder, family disruption, and severe behavioral disturbances.
- ADHD is frequently comorbid with oppositional defiant disorder, major depression, bipolar disorder, anxiety disorders, conduct disorder, and drug dependence in adults.
- Treatments for comorbid mood and anxiety disorders do not treat ADHD and vice versa.
- Comorbidities (such as mood and anxiety disorders) found in girls have been associated not only with a more complex course of ADHD, but also with inhibition of therapeutic responsiveness to stimulant drugs.
- The best known comorbidity in boys with ADHD is conduct disorder; it is less prevalent in girls. Oppositional defiant disorder is more prevalent in girls with ADHD.



- ADHD emerges by the age of three, as opposed to depression, which emerges on average by the age of seven.
- In girls with ADHD, substance abuse emerges earlier (age 11) than it does in boys (approximately age 15).
- Adults with ADHD have the same pattern of comorbidity, as do children.
- The rule of thumb for the treatment of ADHD and comorbidities is to treat the comorbid disorder first.

ADHD AND MANIA

Janet Wozniak, M.D.

Dr. Wozniak described the clinical presentation of juvenile mania and reviewed the treatment approach to afflicted individuals in detail. Irritability, prolonged outbursts, affective storms, and an overlap with ADHD are the rule; she also comprehensively described recent research in the field of childhood and adolescent mania and noted that juvenile mania is not as rare as previously thought. Diagnostic confusion with severe ADHD, because of overlapping symptoms, may occur. Treatment, with lithium, valproate, carbamazepine, lamictal, and atypical neuroleptics, are often effective. Other facts presented regarding juvenile bipolar disorder included:

- The age of onset of juvenile mania is often different from the age of its recognition.
- Juvenile bipolar disorder is estimated to affect 5% of children.
- A rapid onset, psychomotor retardation, a family history of bipolar disorder, and a switch to mania induced by antidepressants facilitate the diagnosis of bipolar disorder.
- Irritability, persistent outbursts, and violent behaviors, such as attacking family members, are also key in the detection of bipolar disorder.
- Adolescent mania is associated with an increased number of suicide attempts.
- Rather than present with euphoria, manic children are more likely to be irritable with affective storms or prolonged and aggressive temper outbursts.
- Euphoric mood in childhood is often seen as being giddy, goofy, silly, or having laughing fits or being the class clown.

- Outbursts often involve threats or attacking behavior towards others, including family members, other children, adults, and teachers.
- Symptoms (e.g., distractibility, hyperactivity, and talkativeness) of mania overlap with manifestations of ADHD.
- Grandiosity in juvenile mania may present as extreme defiance and oppositionality.
- Bipolar disorder is a strong risk factor for substance abuse.
- Treatments for mania do not treat ADHD.

COMORBIDITY OF ADHD WITH SUBSTANCE ABUSE

Timothy E. Wilens, M.D.

Dr. Wilens defined terms (e.g., misuse, abuse, dependence, addiction) and presented epidemiological facts (e.g., regarding prevalence and risk factors) regarding substance abuse. He also discussed the comorbidity of substance abuse disorders and conduct disorder, ODD, depression, bipolar disorder, ADHD, and anxiety disorders. Specific treatment strategies, involving nonpharmacological (e.g., education, psychotherapy, family therapy) and pharmacological (e.g., disulfiram, SSRIs, TCAs, opiate antagonists) and medications for comorbid disorders were presented. Several clinical pearls included:

- Early cigarette use is correlated with later substance abuse.
- Nicotine stimulates release of acetylcholine, dopamine, and serotonin and may operate by binding to the presynaptic dopamine receptor.
- Cigarette smoking is the gateway for further drug abuse as a result of neuroplasticity in the brain.
- Higher rates of substance abuse are noted in children raised in families that abuse substances.
- Treatment of bipolar disorder reduces substance abuse.
- Delinquent peer groups are influential on the development of substance abuse.
- Juvenile substance abuse is associated with conduct disorders, mood disorders, and ADHD.
- Substance abuse may accelerate the emergence of conduct disorder.
- Highly anxious adolescents have an increase risk of substance abuse.



- Youths with substance abuse should be assessed for bipolar disorder.
- 15-40% of grownup ADHD children develop alcohol use disorder.
- 10-30% of grownup ADHD children develop a drug use disorder.
- 30-70% of adult alcoholics meet criteria for ADHD.
- 50-75% of adults with ADHD smoke cigarettes.
- Five of six studies show a reduced incidence of substance abuse disorder when ADHD is treated.
- A history of maternal smoking during pregnancy is associated with a significantly elevated prevalence of ADHD in offspring.
- Parental ADHD and substance use disorder are associated with significantly higher rates of ADHD in their offspring.
- There is a steep rise in substance use disorder between mid-adolescence and adulthood.
- The risk of stimulant abuse is greater with methamphetamine than it is for amphetamine, methylphenidate, or pemoline (in that order).
- Effective treatment of ADHD reduces the risk of developing substance use disorder.
- ADHD is a risk factor for substance abuse.

ASK THE EXPERTS

Joseph Biederman, M.D., Thomas J. Spencer, M.D., Timothy E. Wilens, M.D.; Jefferson Prince, M.D., Moderator

An internationally known panel of experts (and course directors for this course) eloquently fielded questions from the audience related to ADHD.

COURSE AND OUTCOME OF ADHD

Joseph Biederman, M.D.

Dr. Biederman presented another comprehensive overview of the course and outcome of ADHD. He emphasized that follow-up studies have consistently documented persistence of ADHD into adolescence.

- In general, symptoms of ADHD decline with advancing age (although symptom remission is often difficult to define and full recovery is unlikely).

- Hyperactivity and impulsivity tend to decline at a higher rate and at an earlier age than those of inattention.
- Persistent dysfunction is associated with continuous impulsivity, psychiatric comorbidity, exposure to maternal psychopathology, and number of siblings.
- 20% of cases with persistent ADHD perform well in all functional domains.
- Increased family conflict and decreased family cohesion are associated with a persistent course of conduct disorder.
- Children with persistent symptoms of conduct disorder have an increased risk for substance use disorders, ODD, mood disorders, and antisocial disorders.
- The oppositional disordered child who does not have conduct disordered symptoms before age 12 will not develop conduct disorder.
- 50% of children with conduct disorder have bipolar disorder and vice versa.
- Academic functioning improves in ADHD children if they are emotionally stable and free of a learning disorder.

TREATMENTS OF PEDIATRIC ADHD WITH STIMULANTS

Timothy E. Wilens, M.D.

In this talk, Dr. Timothy Wilens comprehensively reviewed state-of-the-art psychopharmacological treatment of ADHD with psychostimulants (e.g., methylphenidate, Adderall, dextroamphetamine, pemoline). The pharmacodynamics, dosing schedules, and side effects of each were reviewed. Several highlights of his discussion included the following:

- Behavior in the classroom improves with stimulant treatment.
- Stimulants are the first-line therapy for those with ADHD.
- Stimulants improve compliance, social interactions, academic efficiency, and accuracy in those with ADHD.
- Stimulants are among the most well studied and safest agents used in pediatric patients.
- Cognition and behavior improve on higher doses of stimulant medication.
- Methylphenidate blocks the dopamine transporter in the synaptic cleft.



- Methylphenidate comes as either a short lasting (1-4 hours) or long-acting (3-6 hours, or 12-hour) preparation.
- Dextroamphetamine has a short half-life (1-4 hours) preparation as well as a long-acting spansule (3-6 hours).
- Pemoline has a longer half-life (11-16 hours) and a slower onset of action.
- Extended release preparations tend to be abused less often than are conventional stimulant preparations.
- Insomnia as a side effect from stimulant use appears to be dose-related.
- Since hepatotoxicity has been reported (uncommonly) with use of pemoline, liver function tests should be checked initially and every two weeks.
- Stimulants enhance vigilance, reaction time, short-term memory, and classroom performance' in addition, they reduce hyperactivity and impulsivity.
- Higher doses of Adderall tend to extend the duration of its effect.
- Sustained release preparations tend to induce tachyphylaxis.
- The behavior of mothers of ADHD-treated individuals improves, as they need to be less vigilant and directive of their child's activities.
- Drug-drug interactions with stimulants are few, with MAOIs representing the only true contraindication.
- Nortriptyline has been effective in oppositionality as well as ADHD, but it has cardiac and anticholinergic side effects and causes weight gain.
- Side effects of TCAs include dry mouth, tachycardia, and constipation.
- SSRIs do not appear to be of benefit for ADHD.
- Clonidine is useful for aggression, hyperactivity, sleep difficulties, and tics.
- Guanfacine causes less sedation than does clonidine.
- Tomoxetine is a noradrenergic agent with a moderate anti-ADHD effect.
- Nortriptyline appears effective for oppositionality with ADHD.
- Coadministration of methylphenidate and atomoxetine does not appear to increase cardiovascular problems beyond those seen with methylphenidate alone.
- Desipramine clearance is unaffected by the addition of stimulants.
- The American Heart Association recommends that when children or adolescents are treated with TCAs, one should inquire about a history of cardiac events, and a family history of prolonged QT syndromes. One should also obtain a baseline electrocardiogram before TCA or phenothiazine therapy. Follow-up visits should include inquiry about symptoms referable to the cardiovascular system (e.g., syncope), and one should get vital signs and an electrocardiogram periodically.

TREATMENT OF PEDIATRIC ADHD WITH NON-STIMULANT ALTERNATIVES

Thomas J. Spencer, M.D.

Dr. Spencer provided an entertaining and comprehensive overview of nonpharmacological and pharmacological treatments of ADHD. Non-pharmacological interventions included education, environmental changes, behavioral modification, as well as family and school supports. Non-stimulant pharmacological treatments reviewed included treatment with bupropion, tricyclic antidepressants (TCAs), selective serotonin reuptake inhibitors (SSRIs), clonidine, guanfacine, and monoamine inhibitors (MAOIs).

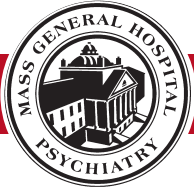
Appropriate medical evaluations were also discussed. Facts presented included:

APPROACHES TO THE OPPOSITIONAL AND AGGRESSIVE ADHD CHILD & SCHOOL INTERVENTION FOR CHILDREN WITH ADHD

Ross Greene, Ph.D.

Ross Greene, Ph.D. eloquently discussed concepts elaborated upon in his recent best selling book, *The Explosive Child: Understanding and Parenting Easily Frustrated, Chronically Inflexible Children* (1998), and suggested methods of teaching and motivating compliant behavior. He noted that oppositional and explosive behavior may result from difficult temperament, ADHD, deficits in social skills, deficits in language processing, mood disorders, anxiety disorders, and juvenile learning disabilities. Other features of oppositional disorder that were discussed included:

- Outbursts often occur outside the presence of others.



- Afflicted individuals seem not to learn from the consequences of their actions; therefore, telling individuals “don’t do it” may not be as effective as teaching individuals to recognize problematic situations and teaching them how to create flexible solutions to problems in evolution.
- ODD is characterized by the inability to interrupt a tantrum.
- Types of inadequate parental discipline include inconsistent discipline, irritable explosive discipline, low supervision, and an inflexible discipline.
- Rewards and punishments should be used to teach simple things, to facilitate learning, and to enhance and motivation.
- ODD is frequently comorbid with ADHD, major depressive disorder, and bipolar disorder.
- Treatment should emphasize antecedents, be situationally specific, involve a graduated training of cognitive skills, and respect neurobiochemical underpinnings of behavior.
- Treatment should involve collaborative problem solving.
- Stability is achieved by building relationships and enhancing communication.
- Oppositional behaviors deprive the afflicted individual of productive activity and pleasurable relationships.
- Skills critical to the development of flexibility and frustration tolerance include self and affective modulation as well as language processing.
- Collaborative problem solving (CPS) approaches emphasize assessing and understanding cognitive deficits that may contribute to the development of oppositional aggressive behaviors.
- Emphasis is focused on antecedents rather than consequences, on situation specificity, on shaping cognitive skills, and on the neurobiochemical underpinnings of behavior.
- ADHD children elicit significantly greater stress in teachers and are rated as more stressful to teach than non-ADHD children.
- Restoring coherence is the primary goal after a meltdown.

MECHANISM OF ACTION OF PSYCHOSTIMULANTS

Nora D. Volkow, M.D.

Dr. Volkow presented a comprehensive talk that highlighted the presumed mechanisms of action of psychostimulants; correlation to anatomic structures and biochemical features formed the key to the presentation.

- The striatum is an area closely related to the function of dopamine transporters.
- Cocaine and methylphenidate have similar affinities for dopamine transporters.
- Oral methylphenidate, with a slower clearance from the dopamine transporter receptors than cocaine has, is not associated with as much abuse.
- In order for cocaine to be reinforcing (and to be abused) at least 50% of the dopamine transporters must be blocked.
- The high associated with use of stimulants appears correlated with the amount of dopamine available in the synapse.
- The ability of methylphenidate to increase performance appears correlated to the release of dopamine in the context of a salient stimulus.

ASSESSMENT DILEMMAS IN THE YOUNG ADULT WITH ADHD

Larry J. Seidman, Ph.D.

Dr. Seidman systematically reviewed the complex issues involved in assessment of young adults with ADHD. In addition, he presented data from a series of studies carried out at the MGH Pediatric Psychopharmacology Unit in collaboration with Drs. Joseph Biederman and Stephen Faraone. Experience from his clinical practice served to highlight the issues presented. Furthermore, the limits of sensitivity and specificity of neuropsychological tests for the diagnosis of ADHD were discussed. Characteristics of neuropsychological assessments were provided in detail. Dr. Seidman also noted:

- Neurocognitive deficits, especially impairment in attention and executive functions, are considered to be common in ADHD.
- A good clinical interview should establish the presence or absence of ADHD, as well as rule-in or rule-out various comorbid conditions.



- Many learning disabilities persist into adulthood (e.g., dyslexia, ADHD, speech and language disorders, autism, and mental retardation).
- Neuropsychological testing involves assessment of attention, intelligence, spatial ability, language, memory, executive function, motor ability, and academic achievement.
- Attention and executive deficits are associated with many disorders other than ADHD (e.g., schizophrenia, depression, petit mal epilepsy, traumatic brain injury, and metabolic disorders); not everyone with inattention has ADHD.
- The overlap of ADHD and learning disability is about 30%. ADHD plus learning disorder worsens executive functioning, increasing the prediction of school failure.
- Attentional difficulties can be screened for by use of the Stroop test, and tests measuring working memory (e.g., digit span, arithmetic) or processing speed (digit symbol) on the Wechsler intelligence test.
- The Wisconsin Card Sorting Test can measure problem solving and perseveration.
- Attentional difficulties can be attributed to sleep deprivation, fatigue, distracting noises, and use of medications (e.g., antihistamines).

ADULT ADHD

Thomas J. Spencer, M.D.

Dr. Spencer presented a comprehensive discourse on ADHD in adults. He reviewed the signs and symptoms of the disorder and provided clinical vignettes to highlight ADHD's clinical features. He noted:

- Almost 50% of cases of ADHD persist into adulthood.
- Current estimates are that 2-3% of adults has ADHD.
- Symptoms in adults include inattention, distractibility, procrastination, poor time management, boredom, hyperactivity, and impulsivity; such problems can lead to low frustration tolerance, short tempers, and frequent job changes.
- Adult ADHD is more familial than is childhood ADHD.
- Adults with ADHD self-report their symptoms reliably.
- Adults with ADHD often have difficulty "playing quietly" and fill their life with activities; they tend to have more

motor vehicle accidents and academic problems than those without ADHD.

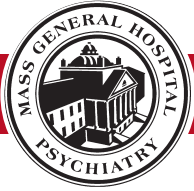
- Persistence of ADHD into adulthood is associated with school and work failure and with low self-esteem.
- Adults with ADHD have deficits in auditory attention and verbal learning, and have difficulties with vigilance and organization or encoding of information.
- Risk of substance abuse disorder doubles in adults with ADHD.

NEUROBIOLOGY OF DYSLLEXIA

Bennett A. Shaywitz, M.D. and Sally E. Shaywitz, M.D.

Drs. Sally and Bennett Shaywitz provided an historical overview of dyslexia and supplemented it with a comprehensive look at the epidemiology of dyslexia. In addition, the cognitive basis of reading was presented and results of functional imaging studies were provided. Among the facts they presented were:

- Reading and reading disability occurs along a continuum.
- Dyslexia is as common in boys as it is in girls.
- Dyslexia is not outgrown.
- Dyslexia affects phonological processing.
- Beginning readers must become aware of the segmental nature of speech.
- Dyslexia involves retrieving and decoding phonologically similar units. The child can comprehend but not decode. Vocabulary, intelligence, reasoning, problem solving, and concept formation remain intact.
- Dyslexic readers identify words slowly, and therefore, they require more time to read (and may be more penalized by multiple choice exams with sparse content).
- Teaching children phonemic awareness in a systematic and explicit way makes a difference in the treatment of dyslexia.
- In dyslexia there appears to be a relative underactivity in posterior brain regions, contrasted with relative over-activation in anterior regions.
- Decoding is impaired in dyslexic readers.
- A phoneme is the smallest unit of discernable sound.



- Phonemes are the common building blocks of spoken language.
- Reading is more difficult than speaking; it is not automatic.

- Serotonergic agents are not in general effective for ADHD.
- Therapeutic agents tend to mediate dopaminergic or noradrenergic receptors.

PHARMACOLOGY OF ADULTS WITH ADHD

Thomas J. Spencer, M.D.

Dr. Spencer supplemented his discussion of ADHD in children with a comprehensive talk on the pharmacological treatments of ADHD in adults. Multimodal treatments, including non-pharmacological (individual, group, family therapy-insight-oriented, interpersonal, cognitive and behavioral) and pharmacological strategies were reviewed. Studies of psychostimulants, tricyclic antidepressants (TCAs), selective serotonin reuptake inhibitors (SSRIs), bupropion, monoamine oxidase inhibitors (MAOIs), buspirone, venlafaxine, experimental compounds (e.g., tomoxetine), and cholinergic agents were presented.

- Stimulant treatment of ADHD aims to improve cognition, academic/occupational performance, a subjective sense of enjoyment and satisfaction, and social skills.
- Improvement with methylphenidate in adults with ADHD is independent of gender, psychiatric comorbidity, and family history.
- Response to methylphenidate in adults appears to be dose-dependent.
- Bupropion, with its combined dopaminergic/noradrenergic mechanism of action is an effective treatment for ADHD, depression, and smoking cessation.
- Bupropion has a low incidence of drug-drug interactions, relatively few side effects, no apparent delays in cardiac conduction, and a reduced rate of seizures with the sustained release preparation.
- MAOIs have been shown superior to placebo-but this class of medications brings with it a risk of hypertensive crisis and the serotonin syndrome.
- Tomoxetine has a high affinity for norepinephrine reuptake inhibition, with little affinity for cholinergic, histaminergic, serotonergic, and adrenergic receptors.
- Efficacy of pharmacotherapy in adults with ADHD is similar to the response seen in children with ADHD.
- Methamphetamine has the highest stimulant abuse liability, while methylphenidate is ranked among the lowest.

MULTIMODAL TREATMENT OF CHILDREN WITH ADHD: FINDINGS FROM THE NIMH STUDY

Howard Abikoff, Ph.D.

Dr. Abikoff described a NIMH multi-site, multimodal treatment study of ADHD. The study rationale, objectives, sample characteristics, designs, multimodal treatments, and treatment outcomes were reviewed. Medication management, behavioral treatment, and combination therapy were offered in the study. Results included:

- For children (aged 7-10) well-delivered medication is superior to behavior management and may be sufficient for ADHD symptoms.
- Behavioral therapy is an acceptable treatment for those preferring not to use medication.
- For some issues other than those related solely to ADHD (e.g., parental conflict, academic difficulties, and oppositional/aggressive symptoms) combination of medication and behavioral management may be preferable.
- Continued improvements over time appear possible (or likely) with careful adherence to treatment.

NEUROPSYCHOLOGY OF ADHD

Alysa Doyle, Ph.D.

Dr. Alysa Doyle reviewed the history, the basic principles, and the key concepts (e.g., normal curves, standard scores, scaled scores) of neuropsychological testing, thereby setting the stage for an understanding of the interpretation of test scores. She also underscored the importance of the neuropsychological test battery (e.g., involving testing of intelligence, executive function, memory, language, and visual-motor integration). She also noted that:

- Neuropsychological deficits may be part of the disorder, part of a comorbid disorder, or sequelae of the disorder.
- Goals of neuropsychological testing include confirming or describing the extent of an underlying deficit, documenting strengths that can be mobilized, and determining the presence or absence of additional deficits that may exacerbate the primary deficit.



- Abnormalities on tests of executive functions (e.g., Stroop, Wisconsin Card Sorting Test) are suggestive of ADHD.
- In ADHD there is dysfunction in the frontal cortex and/or subcortical regions that project to the frontal lobes.
- This fronto-subcortical hypothesis likely involves the neurotransmitter dopamine, consistent with the success of stimulant medications which release dopamine.
- Tests of executive function are just one part of a neuropsychological battery.
- Neuropsychological tests of executive function include the Wisconsin Card Sorting Test, the Stroop Test, the Finger-Tapping test, and the Trail-Making Test.
- Individuals with ADHD perform worse on tests of executive function than do those without ADHD.
- Individuals with executive function impairment often do best in highly structured environments with feedback and supervision, and when they are able to break down large tasks into component parts with clear time frames and deadlines.
- Although girls with ADHD appear to have more intellectual impairment and learning disorders than controls, girls may be less vulnerable to executive deficits than boys with ADHD.
- Neuropsychological testing attempts to create a profile of capacities and deficits, generate hypotheses about a diagnosis, recommend appropriate methods of remediation, or intervention, and predict optimal and sub-optimal environments.
- Neuropsychological tests of executive functions can not be used to diagnose ADHD.

COMPREHENSIVE INTEGRATED TREATMENT PLANNING

Steven C. Schlozman, M.D.

Laced with clinical vignettes, Dr. Schlozman emphasized the importance of setting reasonable expectations (placed in the context of development, disorders, character, family dynamics, and resources). Examples of participation in sports, school, family, and peer groups, highlighted the principles. He advocated maintenance of a developmental focus, e.g., with control/autonomy in early adolescence, to guide the clinicians and to improve function for all in the system. He stressed that it is important to:

- Organize a contingency plan.
- Set reasonable expectations.
- Specify a goal.

LEGAL ISSUES IN TREATING INDIVIDUALS WITH ADHD DISORDERS

Ronald Schouten, M.D., J.D.

Dr. Schouten noted that many physicians at one time or another are concerned about the possibility that they will be accused of wrongdoing. He identified the necessary elements of malpractice claims (i.e., duty, dereliction, direct causation, and damages) and reviewed the principles and elements of informed consent (e.g., the nature of diagnosis, treatment options, expected benefits, risks involved, alternative treatments, and prognosis with or without treatment). Dr. Schouten also highlighted several facts.

- Informed consent is a process by which one individual agrees to allow another individual to intrude upon his bodily integrity where the agreeing party is competent to consent and the consent is given voluntarily with a reasonable degree of knowledge of the situation.
- During discussion of informed consent the benefits can reasonably expect from the proposed treatment should be reviewed as well as the nature and probability of material risks.
- Likely results of no treatment and available treatments, and the risks and benefits of each, should be discussed.
- Exceptions to the requirement of informed consent include involvement in an emergency situation, or where an individual is incompetent.
- Minors (except for emancipated minors, mature minors and by statute) are considered incompetent in decision making.
- A malpractice claim may still be filed when a FDA-approved medication is prescribed.
- Protection against legal action rests on documentation of evidence that the treatment employed was safe and similar to the practice in the community.
- Most errors do not result in a suit.
- A high patient volume and attenuated relationships increase the risk of a suit.
- The physician's duty to the patient involves knowledge, skill, and care.



- A physician may prescribe any FDA approved medication for any purpose, which the physician believes, is appropriate. However, the more unconventional the treatment, the more thoughtful and thorough the documentation and discussion should be.
- ADHD is a disability covered by the Rehabilitative Act of 1973(section 504).
- Good clinical care is good risk management.