

NIH Consensus Statement

Volume 16, Number 2
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Diagnosis and Treatment of Attention Deficit Hyperactivity Disorder (ADHD)

NATIONAL INSTITUTES OF HEALTH
Office of the Director

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NIH Consensus Development Conferences are convened to evaluate available scientific information and resolve safety and efficacy issues related to a biomedical technology. The resultant NIH Consensus Statements are intended to advance understanding of the technology or issue in question and to be useful to health professionals and the public.

NIH Consensus Statements are prepared by nonadvocate, non-Federal panels of experts, based on (1) presentations by investigators working in areas relevant to the consensus questions during a 2-day public session, (2) questions and statements from conference attendees during open discussion periods that are part of the public session, and (3) closed deliberations by the panel during the remainder of the second day and morning of the third. This statement is an independent report of the consensus panel and is not a policy statement of the NIH or the Federal Government.

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This statement reflects the panel's assessment of medical knowledge available at the time the statement was written. Thus, it provides a "snapshot in time" of the state of knowledge on the conference topic. When reading the statement, keep in mind that new knowledge is inevitably accumulating through medical research.



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Disclosure Statement

All of the panelists who participated in this conference and contributed to the writing of this consensus statement were identified as having no financial or scientific conflict of interest, and all signed conflict of interest forms attesting to this fact. Unlike the expert speakers who present scientific data at the conference, the individuals invited to participate on NIH consensus panels are selected specifically because they are not professionally identified with advocacy positions with respect to the conference topic or with research that could be used to answer any of the conference questions.

Abstract

Objective

The objective of this NIH Consensus Statement is to inform the biomedical research and clinical practice communities of the results of the NIH Consensus Development Conference on Diagnosis and Treatment of Attention Deficit Hyperactivity Disorder (ADHD). The statement provides state-of-the-art information regarding effective treatments for ADHD and presents the conclusions and recommendations of the consensus panel regarding these issues. In addition, the statement identifies those areas of study that deserve further investigation. Upon completion of this educational activity, the reader should possess a clear working clinical knowledge of the state of the art regarding this topic. The target audience of clinicians for this statement includes, but is not limited to, psychiatrists, family practitioners, pediatricians, internists, neurologists, psychologists, and behavioral medicine specialists.

Participants

Participants were a non-Federal, nonadvocate, 13-member panel representing the fields of psychology, psychiatry, neurology, pediatrics, epidemiology, biostatistics, education and the public. In addition, 31 experts from these same fields presented data to the panel and a conference audience of 1215.

Evidence

The literature was searched through Medline and an extensive bibliography of references was provided to the panel and the conference audience. Experts prepared abstracts with relevant citations from the literature. Scientific evidence was given precedence over clinical anecdotal experience.

Consensus Process

The panel, answering predefined questions, developed their conclusions based on the scientific evidence presented in open forum and the scientific literature. The panel composed a draft statement that was read in its entirety and circulated to the experts and the audience for comment. Thereafter, the panel resolved conflicting recommendations and released a revised statement at the end of the conference. The panel finalized the revisions within a few weeks after the conference. The draft statement was made available on the World Wide Web immediately following its release at the conference and was updated with the panel's final revisions.

Conclusions

Attention deficit hyperactivity disorder or ADHD is a commonly diagnosed behavioral disorder of childhood that represents a costly major public health problem. Children with ADHD have pronounced impairments and can experience long-term adverse effects on academic performance, vocational success, and social-emotional development which have a profound impact on individuals, families, schools, and society. Despite progress in the assessment, diagnosis, and treatment of ADHD, this disorder and its treatment have remained controversial, especially the use of psychostimulants for both short and long-term treatment.

Although an independent diagnostic test for ADHD does not exist, there is evidence supporting the validity of the disorder. Further research is needed on the dimensional aspects of ADHD, as well as the comorbid (coexisting) conditions present in both childhood and adult forms.

Studies, (primarily short term, approximately three months) including randomized clinical trials, have established the efficacy of stimulants and psychosocial treatments for alleviating the symptoms of ADHD and associated aggressiveness and have indicated that stimulants are more effective than psychosocial therapies in treating these symptoms. Because of the lack of consistent improvement beyond the core symptoms and the paucity of long-term studies (beyond 14 months), there is a need for longer term studies with drugs and behavioral modalities and their combination. Although trials are underway, conclusive recommendations concerning treatment for the long term cannot be made presently.

There are wide variations in the use of psychostimulants across communities and physicians, suggesting no consensus regarding which ADHD patients should be treated with psychostimulants. These problems point to the need for improved assessment, treatment, and follow-up of ADHD patients. A more consistent set of diagnostic procedures and practice guidelines is of utmost importance. Furthermore, the lack of insurance coverage preventing the appropriate diagnosis and treatment of ADHD and the lack of integration with educational services are substantial barriers and represent considerable long-term costs for society.

Finally, after years of clinical research and experience with ADHD, our knowledge about the cause or causes of ADHD remain largely speculative. Consequently, we have no documented strategies for the prevention of ADHD.

Introduction

Attention deficit hyperactivity disorder (ADHD) is the most commonly diagnosed behavioral disorder of childhood, estimated to affect 3 to 5 percent of school-age children. Its core symptoms include developmentally inappropriate levels of attention, concentration, activity, distractibility, and impulsivity. Children with ADHD usually have functional impairment across multiple settings including home, school, and peer relationships. ADHD has also been shown to have long-term adverse effects on academic performance, vocational success, and social-emotional development.

Despite the progress in the assessment, diagnosis, and treatment of children and adults with ADHD, the disorder has remained controversial. The diverse and conflicting opinions about ADHD have resulted in confusion for families, care providers, educators, and policymakers. The controversy raises questions concerning the literal existence of the disorder, whether it can be reliably diagnosed, and, if treated, what interventions are the most effective.

One of the major controversies regarding ADHD concerns the use of psychostimulants to treat the condition. Psychostimulants, including amphetamine, methylphenidate, and pemoline, are by far the most widely researched and commonly prescribed treatments for ADHD. Because psychostimulants are more readily available and are being prescribed more frequently, concerns have intensified over their potential overuse and abuse.

This 2½-day conference brought together national and international experts in the fields of relevant medical research and health care as well as representatives from the public.

After 1½ days of presentations and audience discussion, an independent, non-Federal consensus panel chaired by Dr. David J. Kupfer, Thomas Detre Professor and Chair, Department of Psychiatry, University of Pittsburgh, weighed the scientific evidence and wrote a draft statement that was

presented to the audience on the third day. The consensus statement addressed the following key questions:

- What is the scientific evidence to support ADHD as a disorder?
- What is the impact of ADHD on individuals, families, and society?
- What are the effective treatments for ADHD?
- What are the risks of the use of stimulant medication and other treatments?
- What are the existing diagnostic and treatment practices, and what are the barriers to appropriate identification, evaluation, and intervention?
- What are the directions for future research?

The lead organizations of this conference were the National Institute on Drug Abuse, the National Institute of Mental Health, and the National Institutes of Health (NIH) Office of Medical Applications of Research. The conference was also supported by the National Institute of Environmental Health Sciences, the National Institute of Child Health and Human Development, the U.S. Food and Drug Administration, and the Office of Special Education Programs, U.S. Department of Education.

What Is the Scientific Evidence To Support ADHD as a Disorder?

The diagnosis of ADHD can be made reliably using well-tested diagnostic interview methods. However, as of yet, there is no independent valid test for ADHD. Although research has suggested a central nervous system basis for ADHD, further research is necessary to firmly establish ADHD as a brain disorder. This is not unique to ADHD, but applies as well to most psychiatric disorders, including disabling diseases such as schizophrenia. Evidence supporting the validity of ADHD includes the long-term developmental course of ADHD over time, cross-national studies revealing similar risk factors, familial aggregation of ADHD (which may be genetic or environmental), and heritability.

Additional efforts to validate the disorder are needed: careful description of the cases, use of specific diagnostic criteria, repeated followup studies, family studies (including twin and adoption studies), epidemiologic studies, and long-term treatment studies. To the maximum extent possible, such studies should include various controls, including normal subjects and those with other clinical disorders. Such studies may provide suggestions about subgrouping of patients that will turn out to be associated with different outcomes, responses to different treatment, and varying patterns of familial characteristics and illnesses.

Certain issues about the diagnosis of ADHD have been raised that indicate the need for further research to validate diagnostic methods.

- Clinicians who diagnose this disorder have been criticized for merely taking a percentage of the normal population who have the most evidence of inattention and continuous activity and labeling them as having a disease. In fact, it is unclear whether the signs of ADHD represent a bimodal distribution in the population or one end of a continuum of characteristics. This is not unique to ADHD as other

medical diagnoses, such as essential hypertension and hyperlipidemia, are continuous in the general population, yet the utility of diagnosis and treatment have been proven. Nevertheless, related problems of diagnosis include differentiating this entity from other behavioral problems and determining the appropriate boundary between the normal population and those with ADHD.

- ADHD often does not present as an isolated disorder, and comorbidities (coexisting conditions) may complicate research studies, which may account for some of the inconsistencies in research findings.
- Although the prevalence of ADHD in the United States has been estimated at about 3 to 5 percent, a wider range of prevalence has been reported across studies. The reported rate in some other countries is much lower. This indicates a need for a more thorough study of ADHD in different populations and better definition of the disorder.
- All formal diagnostic criteria for ADHD were designed for diagnosing young children and have not been adjusted for older children and adults. Therefore, appropriate revision of these criteria to aid in the diagnosis of these individuals is encouraged.

In summary, there is validity in the diagnosis of ADHD as a disorder with broadly accepted symptoms and behavioral characteristics that define the disorder.

What Is the Impact of ADHD on Individuals, Families, and Society?

Children with ADHD experience an inability to sit still and pay attention in class and the negative consequences of such behavior. They experience peer rejection and engage in a broad array of disruptive behaviors. Their academic and social difficulties have far-reaching and long-term consequences. These children have higher injury rates. As they grow older, children with untreated ADHD in combination with conduct disorders experience drug abuse, antisocial behavior, and injuries of all sorts. For many individuals, the impact of ADHD continues into adulthood.

Families who have children with ADHD, as with other behavioral disorders and chronic diseases, experience increased levels of parental frustration, marital discord, and divorce. In addition, the direct costs of medical care for children and youth with ADHD are substantial. These costs represent a serious burden for many families because they frequently are not covered by health insurance.

In the larger world, these individuals consume a disproportionate share of resources and attention from the health care system, criminal justice system, schools, and other social service agencies. Methodologic problems preclude precise estimates of the cost of ADHD to society. However, these costs are large. For example, additional national public school expenditures on behalf of students with ADHD may have exceeded \$3 billion in 1995. Moreover, ADHD, often in conjunction with coexisting conduct disorders, contributes to societal problems such as violent crime and teenage pregnancy.

Families of children impaired by the symptoms of ADHD are in a very difficult position. The painful decision-making process to determine appropriate treatment for these children is often made substantially worse by the media war between those who overstate the benefits of treatment and those who overstate the dangers of treatment.

What Are the Effective Treatments for ADHD?

A wide variety of treatments have been used for ADHD including, but not limited to, various psychotropic medications, psychosocial treatment, dietary management, herbal and homeopathic treatments, biofeedback, meditation, and perceptual stimulation/training. Of these treatment strategies, stimulant medications and psychosocial interventions have been the major foci of research. Studies on the efficacy of medication and psychosocial treatments for ADHD have focused primarily on a condition equivalent to DSM-IV combined type, meeting criteria for Inattention and Hyperactivity/Impulsivity. Until recently, most randomized clinical trials have been short term, up to approximately 3 months. Overall, these studies support the efficacy of stimulants and psychosocial treatments for ADHD and the superiority of stimulants relative to psychosocial treatments. However, there are no long-term studies testing stimulants or psychosocial treatments lasting several years. There is no information on the long-term outcomes of medication-treated ADHD individuals in terms of educational and occupational achievements, involvement with the police, or other areas of social functioning.

Short-term trials of stimulants have supported the efficacy of methylphenidate (MPH) dextroamphetamine, and pemoline in children with ADHD. Few, if any, differences have been found among these stimulants on average. However, MPH is the most studied and the most often used of the stimulants. These short-term trials have found beneficial effects on the defining symptoms of ADHD and associated aggressiveness as long as medication is taken. However, stimulant treatments may not “normalize” the entire range of behavior problems, and children under treatment may still manifest a higher level of some behavior problems than normal children. Of concern are the consistent findings that despite the improvement in core symptoms, there is little improvement in academic achievement or social skills.

Several short-term studies of antidepressants show that desipramine produces improvements over placebo in parent and teacher ratings of ADHD symptoms. Results from studies examining the efficacy of imipramine are inconsistent. Although a number of other psychotropic medications have been used to treat ADHD, the extant outcome data from these studies do not allow for conclusions regarding their efficacy.

Psychosocial treatment of ADHD has included a number of behavioral strategies such as contingency management (e.g., point/token reward systems, timeout, response cost) that typically is conducted in the classroom, parent training (where the parent is taught child management skills), clinical behavior therapy (parent, teacher, or both are taught to use contingency management procedures), and cognitive-behavioral treatment (e.g., self-monitoring, verbal self-instruction, problem-solving strategies, self-reinforcement). Cognitive-behavioral treatment has not been found to yield beneficial effects in children with ADHD. In contrast, clinical behavior therapy, parent training, and contingency management have produced beneficial effects. Intensive direct interventions in children with ADHD have produced improvements in key areas of functioning. However, no randomized control trials have been conducted on some of these intensive interventions alone or in combination with medication. Studies that compared stimulants with psychosocial treatment consistently reported greater efficacy of stimulants.

Emerging data suggest that medication using systematic titration and intensive monitoring methods over a period of approximately 1 year is superior to an intensive set of behavioral treatments on core ADHD symptoms (inattention, hyperactivity/impulsivity, aggression). Combined medication and behavioral treatment added little advantage overall, over medication alone, but combined treatment did result in more improved social skills, and parents and teachers judged this treatment more favorably. Both systematically applied medication (monitored regularly) and combined treatment were

superior to routine community care, which often involved the use of stimulants. An important potential advantage for behavioral treatment is the possibility of improving functioning with reduced dose of stimulants. This possibility was not tested.

There is a long history of a number of other interventions for ADHD. These include dietary replacement, exclusion, or supplementation; various vitamin, mineral, or herbal regimens; biofeedback; perceptual stimulation; and a host of others. Although these interventions have generated considerable interest and there are some controlled and uncontrolled studies using various strategies, the state of the empirical evidence regarding these interventions is uneven, ranging from no data to well-controlled trials. Some of the dietary elimination strategies showed intriguing results suggesting the need for future research.

The current state of the empirical literature regarding the treatment of ADHD is such that at least five important questions cannot be answered. First, it cannot be determined if the combination of stimulants and psychosocial treatments can improve functioning with reduced dose of stimulants. Second, there are no data on the treatment of ADHD, Inattentive type, which might include a high percentage of girls. Third, there are no conclusive data on treatment in adolescents and adults with ADHD. Fourth, there is no information on the effects of long-term treatment (treatment lasting more than 1 year), which is indicated in this persistent disorder. Finally, given the evidence about the cognitive problems associated with ADHD, such as deficiencies in working memory and language processing deficits, and the demonstrated ineffectiveness of current treatments in enhancing academic achievement, there is a need for application and development of methods targeted to these weaknesses.

What Are the Risks of the Use of Stimulant Medication and Other Treatments?

Although little information exists concerning the long-term effects of psychostimulants, there is no conclusive evidence that careful therapeutic use is harmful. When adverse drug reactions do occur, they are usually related to dose. Effects associated with moderate doses may include decreased appetite and insomnia. These effects occur early in treatment and may decrease with continued dosing. There may be negative effects on growth rate, but ultimate height appears not to be affected.

It is well known that psychostimulants have abuse potential. Very high doses of psychostimulants, particularly of amphetamines, may cause central nervous system damage, cardiovascular damage, and hypertension. In addition, high doses have been associated with compulsive behaviors and, in certain vulnerable individuals, movement disorders. There is a rare percentage of children and adults treated at high doses who have hallucinogenic responses. Drugs used for ADHD other than psychostimulants have their own adverse reactions: tricyclic antidepressants may induce cardiac arrhythmias, bupropion at high doses can cause seizures, and pemoline is associated with liver damage.

The degree of assessment and followup by primary care physicians varies significantly. This variance may contribute to the marked differences in appropriate prescribing practices. Adequate followup is required for any prescribed medications, especially for higher doses of psycho-stimulants.

Although an increased risk of drug abuse and cigarette smoking is associated with childhood ADHD (see Question 2), existing studies come to conflicting conclusions as to whether use of psychostimulants increases or decreases the risk of abuse. A major limitation of inferences from observational databases is the inability to examine independently the use of stimulant medication, the diagnosis and severity of ADHD, and the effect of coexisting conditions.

The increased availability of stimulant medications may pose risks for society. The threshold of drug availability that can lead to oversupply and consequent illicit use is unknown. There is little evidence that current levels of production have had a substantial effect on abuse. However, there is a need to be vigilant in monitoring the national indices of use and abuse of stimulants among high school seniors. One of the indices is the Drug Abuse Warning Network (DAWN).

What Are the Existing Diagnostic and Treatment Practices, and What Are the Barriers to Appropriate Identification, Evaluation, and Intervention?

The American Academy of Child and Adolescent Psychiatry has published practice parameters for the assessment and treatment of ADHD. The American Academy of Pediatrics has formed a subcommittee to establish parameters for pediatricians, but those guidelines are not available at this time. Primary care and developmental pediatricians, family practitioners, (child) neurologists, psychologists, and psychiatrists are the providers responsible for assessment, diagnosis, and treatment of most children with ADHD. There is wide variation among types of practitioners with respect to frequency of diagnosis of ADHD. Data indicate that family practitioners diagnose more quickly and prescribe medication more frequently than psychiatrists or pediatricians. This may be due in part to the limited time spent making the diagnosis. Some practitioners invalidly use response to medication as a diagnostic criterion, and primary care practitioners are less likely to recognize comorbid (coexisting) disorders. The quickness with which some practitioners prescribe medications may decrease the likelihood that more educationally relevant interventions will be sought.

Diagnoses may be made in an inconsistent manner with children sometimes being overdiagnosed and sometimes underdiagnosed. However, this does not affect the validity of the diagnosis when appropriate guidelines are used. Some practitioners do not use structured parent questionnaires, rating scales, or teacher or school input. Pediatricians, family practitioners, and psychiatrists tend to rely on parent rather than teacher input. There appears to be a “disconnect” between developmental or educational (school-based) assessments and health-related (medical practice-based) services. There is often poor communication between diagnosticians and those who implement and monitor treatment in schools.

In addition, followup may be inadequate and fragmented. This is particularly important to ensure monitoring and early detection of any adverse effect of therapy. School-based clinics with a team approach that includes parents, teachers, school psychologists, and other mental health specialists may be a means to remove these barriers and improve access to assessment and treatment. Ideally, primary care practitioners with adequate time for consultation with such school teams should be able to make an appropriate assessment and diagnosis, but they should also be able to refer to mental health and other specialists when deemed necessary.

What are the barriers to appropriate identification, evaluation, and intervention?

Studies identify a number of barriers to appropriate identification, evaluation, and treatment. Barriers to identification and evaluation arise when central screening programs limit access to mental health services. The lack of insurance coverage for psychiatric or psychological evaluations, behavior modification programs, school consultation, parent management training, and other specialized programs presents a major barrier to accurate classification, diagnosis, and management of ADHD. Substantial cost barriers exist in that diagnosis results in out-of-pocket costs to families for services not covered by managed care or other health insurance. Mental health benefits are carved out of many policies offered to families, and thus access to treatment other than medication might be severely limited. Parity for mental health conditions in insurance plans is essential. Another cost implication lies in the fact that there is no funded special education category specifically for ADHD, which leaves these students underserved, and there is currently no tracking or monitoring of children with ADHD who are served outside of special education. This results in educational and mental health service sources disputing responsibility for coverage of special educational services.

Barriers exist in relationship to gender, race, socioeconomic factors, and geographical distribution of physicians who identify and evaluate patients with ADHD.

Other important barriers include those perceived by patients, families, and clinicians. These include lack of information, concerns about risks of medications, loss of parental rights, fear of professionals, social stigma, negative pressures from families and friends against seeking treatment, and jeopardizing jobs and military service. For health care providers, the lack of specialists and difficulties obtaining insurance coverage as outlined above present significant obstacles to care.

What Are the Directions for Future Research?

Basic research is needed to better define ADHD. This research includes the following: (1) studies of cognitive development, cognitive processing, and attention/inattention in ADHD and (2) brain imaging studies before the initiation of medication and following the individual through young adulthood and middle age.

Further research should be conducted with respect to the dimensional aspects of this disorder, as well as the comorbid (coexisting) conditions present in both childhood and adult ADHD. Therefore, an important research need is the investigation of standardized age- and gender-specific diagnostic criteria.

The impact of ADHD should be determined. Studies in this regard include (1) the nature and severity of the impact on individuals, families, and society of adults with ADHD beyond the age of 20 and (2) determination of the financial costs related to diagnosis and care of children with ADHD.

Additional studies are needed to develop a more systematized treatment strategy. These include:

- Studies of the Inattentive type of ADHD, especially since it might include a higher proportion of girls than the subtypes with hyperactivity/impulsivity.
- Studies of long-term treatment (treatment lasting longer than 1 year), which are needed because of the persistence of the disorder.
- Prospective controlled studies, up to adulthood, of the risks and benefits associated with childhood treatment with psychostimulants.
- Studies to determine the effects of psychotropic therapy on cognitive function and school performance.
- Studies of the effects of instructional treatments on the academic achievement of children with ADHD.

- Studies to determine whether the combination of stimulants and psychosocial treatments can improve functioning with a reduced dose of stimulants.
- Studies to determine the risks and benefits associated with treating children younger than age 5 with stimulants.
- Studies of the effects of various stimulants in adolescents and adults.

Greater attention should be given to developing integrated programs for diagnosis and treatment. These include:

- Model projects to demonstrate methods of training teachers to recognize and provide appropriate special programs for children with ADHD.
- Incorporation of classroom strategies to effectively serve a greater variety of students and thereby reduce the need for ADHD referral and diagnosis.
- Determination of the extent to which individuals with ADHD are being served in postsecondary education and, if so, where they are being served, with what types of accommodations, and with what level of success.

Conclusions

Attention deficit hyperactivity disorder or ADHD is a commonly diagnosed behavioral disorder of childhood that represents a major public health problem. Children with ADHD usually have pronounced difficulties and impairments resulting from the disorder across multiple settings. They can also experience long-term adverse effects on academic performance, vocational success, and social-emotional development.

Despite progress in the assessment, diagnosis, and treatment of ADHD, this disorder and its treatment have remained controversial in many public and private sectors. The major controversy regarding ADHD continues to be the use of psychostimulants both for short-term and long-term treatment.

Although an independent diagnostic test for ADHD does not exist, evidence supporting the validity of the disorder can be found. Further research will need to be conducted with respect to the dimensional aspects of ADHD, as well as the comorbid (coexisting) conditions present in both childhood and adult ADHD. Therefore, an important research need is the investigation of standardized age- and gender-specific diagnostic criteria.

The impact of ADHD on individuals, families, schools, and society is profound and necessitates immediate attention. A considerable share of resources from the health care system and various social service agencies is currently devoted to individuals having ADHD. Often the services are delivered in a nonintegrated manner. Resource allocation based on better cost data leading to integrated care models needs to be developed for individuals with ADHD.

Effective treatments for ADHD have been evaluated primarily for the short term (approximately 3 months). These studies have included randomized clinical trials that have established the efficacy of stimulants and psychosocial treatments for alleviating the symptoms of ADHD and associated aggressiveness and have indicated that stimulants are more effective than psychosocial therapies in treating these symptoms.

Lack of consistent improvement beyond the core symptoms leads to the need for treatment strategies that utilize combined approaches. At the present time, there is a paucity of data providing information on long-term treatment beyond 14 months. Although trials combining drugs and behavioral modalities are underway, conclusive recommendations concerning treatment for the long term cannot be made easily.

The risks of treatment, particularly the use of stimulant medication, are of considerable interest. Substantial evidence exists of wide variations in the use of psychostimulants across communities and physicians, suggesting no consensus among practitioners regarding which ADHD patients should be treated with psychostimulants. As measured by attention/activity indices, patients with varying levels and types of problems (and even possibly unaffected individuals) may benefit from stimulant therapy. However, there is no evidence regarding the appropriate ADHD diagnostic threshold above which the benefits of psychostimulant therapy outweigh the risks.

Existing diagnostic and treatment practices, in combination with the potential risks associated with medication, point to the need for improved awareness by the health service sector concerning an appropriate assessment, treatment, and followup. A more consistent set of diagnostic procedures and practice guidelines is of utmost importance. Current barriers to evaluation and intervention exist across the health and education sectors. The cost barriers and lack of coverage preventing the appropriate diagnosis and treatment of ADHD and the lack of integration with educational services represent considerable long-term cost for society. The lack of information and education about accessibility and affordability of services must be remedied.

Finally, after years of clinical research and experience with ADHD, our knowledge about the cause or causes of ADHD remains speculative. Consequently, we have no strategies for the prevention of ADHD.

Consensus Development Panel

David J. Kupfer, M.D.

*Panel and Conference
Chairperson*
Thomas Detre Professor
and Chair of Psychiatry
Western Psychiatric Institute
and Clinic
Department of Psychiatry
University of Pittsburgh
Pittsburgh, Pennsylvania

Robert S. Baltimore, M.D.

*Professor of Pediatrics,
Epidemiology, and
Public Health*
Division of Infectious Diseases
Department of Pediatrics
Yale University
School of Medicine
New Haven, Connecticut

Donald A. Berry, Ph.D.

Professor
Institute of Statistics and
Decision Sciences
Duke University Medical Center
Durham, North Carolina

Naomi Breslau, Ph.D.

Director of Research
Department of Psychiatry
Henry Ford Health System
Detroit, Michigan

Everett H. Ellinwood, M.D.

*Professor of Psychiatry
and Pharmacology*
Duke University Medical Center
Durham, North Carolina

Janis Ferre

Past Chair
Utah Governor's Council for
People With Disabilities
Salt Lake City, Utah

Donna M. Ferriero, M.D.

Associate Professor of Neurology
Division of Child Neurology
Department of Neurology
University of California,
San Francisco
San Francisco, California

Lynn S. Fuchs, Ph.D.

Professor
Department of Special Education
Peabody College
Vanderbilt University
Nashville, Tennessee

Samuel B. Guze, M.D.

*Spencer T. Olin Professor
of Psychiatry*
Department of Psychiatry
Washington University
School of Medicine
St. Louis, Missouri

Beatrice A. Hamburg, M.D.

Visiting Professor
Department of Psychiatry
Cornell University
Medical College
New York, New York

Jane McGlothlin, Ph.D.

*Assistant Superintendent for
Curriculum and Instruction*
Scottsdale Unified School
District
Phoenix, Arizona

Samuel M. Turner, Ph.D., ABPP

*Professor of Psychology
Director of Clinical Training*
Department of Psychology
University of Maryland
College Park, Maryland

Mark Vonnegut, M.D.

Pediatrician
Milton Pediatrics
Quincy, Massachusetts

Speakers

Howard Abikoff, Ph.D.

Professor of Clinical Psychiatry
Director of Research
NYU Child Study Center
New York University School
of Medicine
New York, New York

Sheila Anderson

Immediate Past National President
Children and Adults With
Attention Deficit Disorders
Plantation, Florida

L. Eugene Arnold, M.D., M.Ed.

Professor Emeritus of Psychiatry
Ohio State University, Columbus
Sunbury, Ohio

Russell A. Barkley, Ph.D.

Director of Psychology
Department of Psychiatry
University of Massachusetts
Medical Center
Worcester, Massachusetts

Joseph Biederman, M.D.

Professor of Psychiatry,
Harvard Medical School
Chief, Joint Program in Pediatric
Psychopharmacology
Massachusetts and McLean
General Hospitals
Boston, Massachusetts

Hector R. Bird, M.D.

Professor
Clinical Psychiatry
Columbia University
Deputy Director
Child Psychiatry
New York State Psychiatric
Institute
New York, New York

Peter R. Breggin, M.D.

Director
Center for the Study of
Psychiatry and Psychology
Bethesda, Maryland

William B. Carey, M.D.

Clinical Professor of Pediatrics
University of Pennsylvania
School of Medicine
Division of General Pediatrics
Children's Hospital of Philadelphia
Philadelphia, Pennsylvania

Betty Chemers, M.A.

Director of Research and
Program Development
Office of Juvenile Justice and
Delinquency Prevention
Washington, District of Columbia

C. Keith Conners, Ph.D., M.A.

Director, ADHD Program
Department of Psychiatry
Duke University Medical Center
Durham, North Carolina

James R. Cooper, M.D.

Associate Director for
Medical Affairs
Division of Clinical and
Services Research
National Institute on Drug Abuse
National Institutes of Health
Rockville, Maryland

Louis Danielson, Ph.D.

Director, Division of Research
to Practice
Office of Special Education
Programs
Office of Special Education
and Rehabilitative Services
U.S. Department of Education
Washington, District of Columbia

Gretchen Feussner

Pharmacologist
Drug and Chemical Evaluation
Section
Office of Diversion Control
Drug Enforcement Administration
Arlington, Virginia

Steven R. Forness, Ed.D.

*Professor of Psychiatry and
Biobehavioral Sciences
Neuropsychiatric Hospital
University of California,
Los Angeles
Los Angeles, California*

Laurence L. Greenhill, M.D.

*Research Psychiatrist II
New York State Psychiatric
Institute
Columbia University
New York, New York*

Stephen P. Hinshaw, Ph.D.

*Professor of Psychology
Director of Clinical Psychology
Training Program
Department of Psychology
University of California, Berkeley
Berkeley, California*

Kimberly Hoagwood, Ph.D.

*Chief of Child and Adolescent
Services Research
Services Research Branch
National Institute of Mental Health
National Institutes of Health
Rockville, Maryland*

Peter S. Jensen, M.D.

*Associate Director for Child
and Adolescent Research
National Institute of Mental Health
National Institutes of Health
Rockville, Maryland*

Charlotte Johnston, Ph.D.

*Associate Professor
Department of Psychology
University of British Columbia
Vancouver, British Columbia
Canada*

Peter W. Kalivas, Ph.D.

*Professor and Chair
Department of Physiology
and Neuroscience
Medical University of
South Carolina
Charleston, South Carolina*

Kelly J. Kelleher, M.D., M.P.H.

*Staunton Professor of
Pediatrics and Psychiatry
Child Services Research and
Development Program
University of Pittsburgh
Pittsburgh, Pennsylvania*

Rachel G. Klein, Ph.D.

*Director of Clinical Psychology
Department of Psychology
New York State Psychiatric
Institute
New York, New York*

Benjamin B. Lahey, Ph.D.

*Professor of Psychiatry
Chief of Psychology
Department of Psychiatry
University of Chicago
Chicago, Illinois*

Nadine M. Lambert, Ph.D.

*Professor, Cognition and
Development Area
Director, School Psychology
Program
Graduate School of Education
University of California, Berkeley
Berkeley, California*

Jan Loney, Ph.D.

*Professor
Department of Psychiatry
State University of New York
at Stony Brook
Stony Brook, New York*

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William E. Pelham, Jr., Ph.D.

*Professor and Director of
Clinical Training*
Department of Psychology
State University of New York
at Buffalo
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Epidemiologist
Epidemiology Branch
National Institute of Environ-
mental Health Sciences
National Institutes of Health
Research Triangle Park,
North Carolina

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Professor of Pediatrics
Department of Pediatrics
University of California, Irvine
Irvine, California

Rosemary Tannock, Ph.D.

Scientist
Associate Professor of Psychiatry
Brain and Behavior Program
Research Institute for the
Hospital for Sick Children
University of Toronto
Toronto, Ontario
Canada

Timothy E. Wilens, M.D.

Associate Professor of Psychiatry
Harvard Medical School
Massachusetts General Hospital
Boston, Massachusetts

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Nashville, Tennessee

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National Institutes of Health
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National Institutes of Health
Rockville, Maryland

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Division of Fundamental
Neuroscience and Develop-
mental Disorders
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Disorders and Stroke
National Institutes of Health
Bethesda, Maryland

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Director
Division of Mental Health and
Prevention of Substance Abuse
World Health Organization
Geneva, Switzerland

Dorynne J. Czechowicz, M.D.
Medical Officer
Division of Clinical and
Services Research
National Institute on Drug Abuse
National Institutes of Health
Rockville, Maryland

Jerry M. Elliott
*Program Analysis and
Management Officer*
Office of Medical Applications
of Research
National Institutes of Health
Bethesda, Maryland

John H. Ferguson, M.D.
Director
Office of Medical Applications
of Research
National Institutes of Health
Bethesda, Maryland

Gretchen Feussner
Pharmacologist
Drug and Chemical Evaluation
Section
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Laurence L. Greenhill, M.D.
Research Psychiatrist II
New York State Psychiatric
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Columbia University
New York, New York

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Drug Enforcement Administration
Arlington, Virginia

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Western Psychiatric Institute
and Clinic
Department of Psychiatry
University of Pittsburgh
Pittsburgh, Pennsylvania

Benjamin B. Lahey, Ph.D.
*Professor of Psychiatry
Chief of Psychology*
Department of Psychiatry
University of Chicago
Chicago, Illinois

Jan Loney, Ph.D.
Professor
Department of Psychiatry
State University of New York
at Stony Brook
Stony Brook, New York

Reid Lyon, Ph.D.

Chief
Child Development and
Behavior Branch
National Institute of Child Health
and Human Development
National Institutes of Health
Bethesda, Maryland

Stuart L. Nightingale, M.D.

*Associate Commissioner for
Health Affairs*
Food and Drug Administration
Rockville, Maryland

William E. Pelham, Jr., Ph.D.

*Professor and Director of
Clinical Training*
Department of Psychology
State University of New York
at Buffalo
Buffalo, New York

Elizabeth Rahdert, Ph.D.

Research Psychologist
Treatment Research Branch
Division of Clinical and
Services Research
National Institute on Drug Abuse
National Institutes of Health
Rockville, Maryland

Andrew S. Rowland, Ph.D.

Epidemiologist
Epidemiology Branch
National Institute of Environ-
mental Health Sciences
National Institutes of Health
Research Triangle Park,
North Carolina

Ellen Schiller, Ph.D.

Special Assistant
Division of Research to Practice
Office of Special Education
Programs
U.S. Department of Education
Washington, District of Columbia

Bennett Shaywitz, M.D.

*Professor of Pediatrics
and Neurology*
Department of Pediatrics
Yale University School
of Medicine
New Haven, Connecticut

Charles R. Sherman, Ph.D.

Deputy Director
Office of Medical Applications
of Research
National Institutes of Health
Bethesda, Maryland

Benedetto Vitiello, M.D.

Chief
Child and Adolescent Treatment
and Preventive Intervention
Research Branch
Division of Services and
Intervention Research
National Institute of Mental Health
National Institutes of Health
Rockville, Maryland

Timothy E. Wilens, M.D.

Associate Professor of Psychiatry
Harvard Medical School
Massachusetts General Hospital
Boston, Massachusetts

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Diagnosis and Treatment of Attention Deficit Hyperactivity Disorder (ADHD)

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OBJECTIVE

The objective of this NIH Consensus Statement is to inform the biomedical research and clinical practice communities of the results of the NIH Consensus Development Conference on Diagnosis and Treatment of Attention Deficit Hyperactivity Disorder (ADHD). The statement provides state-of-the-art information regarding the diagnosis and various treatment options for patients with ADHD, and presents the conclusions and recommendations of the consensus panel regarding these issues. In addition, the statement identifies those areas of study that deserve further investigation. Upon completing this educational activity, the reader should possess a clear working clinical knowledge of the state-of-the-art regarding this topic.

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The National Institutes of Health/Foundation for Advanced Education in the Sciences is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians.

The National Institutes of Health/Foundation for Advanced Education in the Sciences designates this educational activity for a maximum of one hour in Category 1 credit towards the AMA Physician's Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

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This form must be completed and **postmarked by November 18, 2001**, for eligibility to receive continuing medical education credit for this continuing medical education activity. The expiration date for this test may be extended beyond November 18, 2001. Beginning November 19, 2001, please check the NIH Consensus Development Program web site (<http://consensus.nih.gov>) or call the NIH Office of Medical Applications of Research at 301-496-1144 for information regarding an extended expiration date for this continuing medical education activity.

INSTRUCTIONS

The consensus statement contains the correct answers to the following 15 questions. Select your answer(s) to each question and write the corresponding letter(s) in the answer space provided. Mail the completed test by the expiration date shown above to *CME Program, Office of Medical Applications of Research, National Institutes of Health, Building 31, Room 1B03, 31 Center Drive, MSC 2082, Bethesda, MD 20892-2082*. You will receive notification of your test results within 2 to 3 weeks. If you have successfully completed the test (11 or more correct answers), you will receive a certificate for 1 hour of continuing education credit along with your test results. The estimated time to complete this educational activity is 1 hour. Photocopies of this form are acceptable. There is no fee for participating in this continuing education activity.



1. **ADHD appears to affect about 1 to 2% of U.S. school-aged children.**

- a. True
- b. False

ANSWER: _____

2. **There is clear evidence that ADHD as a valid disorder with broadly accepted symptoms and behavioral characteristics that define it.**

- a. True
- b. False

ANSWER: _____

3. **Evidence supporting the validity of ADHD includes the following:**
(You must indicate all that are true.)

- a. long-term developmental course of ADHD over time,
- b. cross-national studies revealing similar risk factors,
- c. familial aggregation of ADHD and heritability
- d. recent evidence of biologic markers for ADHD.
- e. similar prevalence rates across countries

ANSWER(S): _____

4. **Given the variability of ADHD behaviors across settings, and differences in people's opinions about what is abnormal, ADHD cannot be reliably diagnosed.**

- a. True
- b. False

ANSWER: _____

5. **Recent brain imaging studies have demonstrated that ADHD is due to a specific type of brain malfunction.**

- a. True
- b. False

ANSWER: _____

6. **Research evidence has demonstrated that the following agents are efficacious treatments for ADHD:** *(You must indicate all that are true.)*

- a. tricyclic antidepressants
- b. psychostimulant medications
- c. the SSRIs, or selective serotonin uptake inhibitors
- d. various dietary supplements, such as long-chain fatty acids

ANSWER(S): _____

7. **Research evidence has demonstrated that the following non-pharmacologic treatments are efficacious for ADHD:** *(You must indicate all that are true.)*

- a. biofeedback
- b. contingency management
- c. elimination diets
- d. behavior therapy
- e. social skills training
- f. parent training
- g. cognitive behavioral therapy

ANSWER(S): _____

8. Stimulant medications are generally safe, taken as prescribed.

- a. True
- b. False

ANSWER: _____

9. Which of the following statements are true? (You must indicate all that are true.)

- a. ADHD is a serious public health problem.
- b. School expenditures for ADHD exceed \$10 billion/year.
- c. ADHD results in significant impairment across multiple settings.
- d. Most children with ADHD grow out of it.
- e. Side effects of stimulants tend to be mild, are dose-related, and tend to decrease over time.

ANSWER(S): _____

10. Which of the following statements are true? (You must indicate all that are true.)

- a. ADHD has been recognized and diagnosed in other countries, usually at rates similar to the U.S.
- b. children with ADHD have higher injury rates
- c. stimulant treatments appear to be generally more effective than behavioral treatments
- d. after decades of use, it can now be concluded that long-term treatments with stimulants are safe and effective.
- e. recent evidence suggests that there may be some advantages to combining medication and behavioral treatments versus using either treatment alone.

ANSWER(S): _____

11. In daily clinical practice, ADHD tends to be diagnosed in an inconsistent manner, with children sometimes being overdiagnosed and sometimes underdiagnosed.

- a. True
- b. False

ANSWER: _____

12. In general, there is good communication between diagnosticians and those who monitor treatment in schools.

- a. True
- b. False

ANSWER: _____

13. Given the abuse potential of psychostimulants, most recent evidence suggests that follow-up treatment is generally carefully done and closely supervised.

- a. True
- b. False

ANSWER: _____

14. Given recent evidence about the etiology of ADHD from neurophysiologic, genetic, and brain imaging studies, new opportunities for prevention are now apparent, and studies of these new preventive approaches should be mounted.

- a. True
- b. False

ANSWER: _____

15. Most insurance companies and managed care plans now provide coverage for ADHD on par with most other medical disorders.

- a. True
- b. False

ANSWER: _____

Your response to the following four questions is optional and will have no effect on the grading results of this test.

To what extent did this CME activity meet the stated objectives?

- a. not at all
- b. very little
- c. somewhat
- d. considerably
- e. completely

ANSWER: _____

To what extent will participation in this CME activity enhance your professional effectiveness?

- a. not at all
- b. very little
- c. somewhat
- d. considerably
- e. completely
- f. does not apply

ANSWER: _____

Do you have additional comments you think would enhance the utility or impact of this NIH Consensus Statement?

Are there new topics you would like to have covered in a similar or related NIH Consensus Development Conference or Statement?

NAME *(Please type or print clearly)*

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Office of Medical Applications of Research
National Institutes of Health
Building 31, Room 1B03
31 Center Drive MSC-2082
Bethesda, MD 20892-2082