

# International Variation in Treatment Procedures for ADHD: Social Context and Recent Trends

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**Objective:** Scientific and clinical interest in attention-deficit hyperactivity disorder (ADHD) is increasing worldwide. This article presents data from a cross-national workshop and survey related to questions of international variability in diagnostic and, particularly, treatment procedures for ADHD. **Methods:** Representatives of nine nations (Australia, Brazil, Canada, China, Germany, Israel, the Netherlands, Norway, and the United Kingdom), plus the United States, who attended a 2010 workshop on ADHD responded to a survey that addressed the following issues for their respective nations: diagnostic procedures for ADHD; treated prevalence of medication approaches, as well as psychosocial interventions for ADHD; types of medications and psychosocial treatments in use; payment systems in each country; beliefs and values of the nation's education system; recent trends related to adult ADHD; and cultural and historical attitudes and influences related to treatment. **Results:** Use of both medication and psychosocial treatment for ADHD varies widely within and across nations. More expensive long-acting formulations of medications are becoming more widespread. Nations with socialized medical care provide a wide array of evidence-based interventions. In some nations economic, historical, and political forces, along with cultural values placed on achievement, are related to predominant attitudes and practices linked to treatment. Strong antipsychiatry and antim medication voices remain influential in many nations. **Conclusions:** Wide differences in culture and medical treatments across countries have led to considerable variation in implementation of care for ADHD. Recognition of the social context of ADHD is an important step in ensuring access to evidence-based interventions for this prevalent, chronic, and impairing condition. (*Psychiatric Services* 62:XXXXXX, 2011)

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Attention-deficit hyperactivity disorder (ADHD) has received wide international recognition as a chronic neurodevelopmental disorder leading to high levels of impairment (1) and requiring effective service delivery. Concerns have been raised about cross-national variation in the prevalence of ADHD, under the assumption that cultural differences are likely to underlie disparities between countries (2). However, a meta-regression analysis by Polanczyk and colleagues (3) showed that despite international variation in prevalence estimates for ADHD (around an overall mean of slightly more than 5%), most of the cross-country variation was attributable to methodological differences—such as diverging definitions of the disorder or different algorithms for combining assessment information—rather than to cultural or national-level factors.

However, there is substantial evidence of huge variation in both the treated prevalence of ADHD and treatment practices for individuals with this condition (4). Even within a single nation, strong regional variation exists with respect to evaluation and treatment procedures (5,6; Mitchell PB, Levy F, Hadzi-Pavlovic D, et al., unpublished manuscript, 2011). The aim of this study was to assess diagnostic and treatment practices for ADHD in ten nations both to illustrate the impact of cultural and

economic factors on service delivery and to promote evidence-based care.

## Methods

The data presented here are based on presentations of research findings by international leaders in developmental psychopathology research. Eighteen child and adolescent psychiatrists and psychologists participated in a workshop entitled "Understanding the International Variability in ADHD Diagnosis and Treatment," held on March 12 and 13, 2010, in Berkeley, California. For the conference and this report, countries were selected to represent those with high rates of diagnosis and treatment of youths with ADHD and those with lower rates (4).

Before attending the workshop, participants responded to a survey prepared by the first three authors that asked about ADHD treatment and policy issues in the participant's country. Responses were based on reviews of the literature and current practices within each country. Participants were asked to find published information, when available, and to include recent practice parameters or data from national databases. The first three authors reviewed the quality of all responses.

The survey included the following eight questions: What system is used to diagnose ADHD, and which professionals are most involved in assessment and diagnosis? What is the treated prevalence of ADHD in terms of medication? Which medications are used, what is the relative share of each, and which professionals are involved in medication treatments? Which psychosocial treatments are used, what is the treated prevalence, and what is the relative share of each? What payment systems are used for treatments, and where are treatments "located" in the service delivery system? What are the predominant beliefs in the education system with respect to assessment and treatment of ADHD? For adult ADHD, what are current trends in prevalence and treatment? What are the key cultural, historical, or national influences related to ADHD treatment?

All participants presented their re-

sponses to the survey during the workshop. Discussion followed, which provided the framework for the findings presented here. We summarize highlights of similarities and differences and suggest means of providing optimal services.

## Results and discussion

*DSM-IV* (7) is the predominant diagnostic system in use internationally, although some nations rely officially on the *ICD-10* (8). In China a modification of the *ICD*, known as the *Chinese Categories of Mental Disorders*, is used. Across all countries, primary care physicians (family physicians and pediatricians) as well as more specialized professionals (psychologists, psychiatrists, and neurologists) are involved in diagnosis. In many nations, diagnosis in clinical practice often diverges widely from diagnostic practices in research investigations. Differences were noted in the extent to which allied health professionals are involved in multidisciplinary teams that treat individuals with ADHD.

The prevalence of medication treatment varies greatly both within and across nations. Until quite recently Brazil reported extremely low use of medication treatment for ADHD, which may be related to predominant theoretical and political beliefs in that country. However, other countries reflect U.S. trends: at least half of all individuals with an ADHD diagnosis (particularly children and adolescents) receive medication. In countries that had regional data, such as Australia, Canada, Germany, Israel, and the United States, marked variation across regions renders averaged statistics potentially misleading. Participants commented that the prevalence of medication treatment was often limited by ideologies based on particular theories, the population's lack of acceptance of ADHD on cultural grounds, or the impact of organizations that deny the existence of ADHD.

In countries where medication use is more common, a trend was noted toward greater use of long-duration medications and toward subsidies for these costly medications from gov-

ernment agencies or insurance companies. In more remote regions, or regions with more fragile health care systems, inexpensive immediate-release formulations remain the norm. Global evidence on the relative market share of short- and longer-duration medications indicates a trend toward an increased market share for newer, long-duration medications despite their far higher cost (4).

Substantial variability in the use of psychosocial treatments is also evident. Germany often utilizes occupational therapy, such as motor coordination training. Brazil offers few psychosocial interventions except in specialty clinics at universities or in private practice in major cities. The Canadian Attention Deficit Disorder Resource Alliance ([www.caddra.ca](http://www.caddra.ca)) has developed practice guidelines that are available on the Internet, along with free and user-friendly guides to diagnosis and treatment. The Canadian materials are based on the premise that optimization of care for ADHD requires individualized treatment. Medication is viewed as a first-line treatment in some countries, although the guidelines of the National Institute on Clinical Excellence (NICE) in the United Kingdom advocate for use of psychosocial treatments first in many cases. In Canada the sequencing and combining of pharmacologic and psychosocial interventions are determined by physician and patient preference. Overall, historical precedent within a given nation, the predominant training models promoted in academic and medical centers, and reimbursement practices are key factors in determining which treatments are promoted and utilized.

A major factor in ADHD treatment is the structure of the medical payment system. Some countries such as Canada, the United Kingdom, Australia, and Norway have highly centralized health care systems that are either free or involve small copayments. Israel has a system based on health maintenance organizations. Germany has a mixed statutory-private insurance model. Complex mixtures of payment models exist in Brazil, China, the Netherlands, and the United States. Given these

differences, the best global strategy for improvement in care would prioritize policy- and service-related objectives that promote the overall quality of care.

The ways in which school settings perceive and react to ADHD symptoms of children differ widely between countries. Survey respondents from Israel commented on the tolerance for high activity levels in the nation's classrooms, whereas respondents from China noted that children are expected to remain still and on task for long hours in large, structured, quiet classrooms. Comments from Brazil indicated that the country retains a highly psychoanalytic perspective on ADHD, which results in low rates of referral from schools. Indeed, some State Councils on Psychology in Brazil have officially campaigned against ADHD (and dyslexia) as "true" disorders. Because of strong regional variation in the United States (6), there are divergent norms for deviant classroom behavior.

Data on adult ADHD were sparse in the survey, although nearly all nations reported that awareness of manifestations of ADHD in adulthood is increasing, with a resulting pressure for evaluations and treatments. All countries are experiencing a key issue: there are few service models for adults with ADHD, and in many cases pediatricians continue to provide treatment for individuals with ADHD who reach the age of majority.

Participants also highlighted salient points about cultural, historical, and national attitudes influencing the treatment of ADHD in their particular nation. Below we provide relevant excerpts, omitting the United States because of space considerations. [Responses to the eight survey questions are summarized in a table in an online appendix to this article at [ps.psychiatryonline.org](http://ps.psychiatryonline.org).]

#### *Australia*

In Australia a 2002 national survey of a representative sample of 4,500 children and adolescents found a prevalence rate of 11.2% for ADHD (9). The authors concluded that there was a significant gap between prevalence and the availability of trained

professionals to provide services. Across-state variability in use of medication has been documented (Mitchell PB, Levy F, Hadzi-Pavlovic D, et al., unpublished manuscript, 2011), driven by service availability, professional leadership, and rates of public funding.

The draft Australian National Health and Medical Research Council guidelines for diagnosis and treatment of ADHD were issued in 2009 (10). The guidelines were developed by a multidisciplinary expert reference group, who surveyed the evidence-based literature. The guidelines recommend that medication should not be used as a first-line treatment for preschool children with ADHD; when stimulants are tried, they should be used in a low dose, in short-acting forms only, and in close conjunction with appropriate behavioral intervention. For school-aged children, treatment of severe ADHD with stimulants is considered a first-line treatment if it is in line with child and parent or caregiver preferences. Parallel recommendations are in place for adults, as long as medication does not cause unacceptable side effects.

#### *Brazil*

Psychoanalysis is still the predominant theoretical perspective in the clinical professions in Brazil, as well as in print media and television. Furthermore, the presence of a military dictatorship in Brazil until a few decades ago led to frequent discourse about links between political repression and medical treatment for behavioral disorders, particularly psychotropic medications. Thus, until quite recently, biomedical perspectives and medication use were decidedly out of favor.

In addition, the education system is largely under the influence of "constructivism," meaning that behavioral problems are not viewed as related to clinical manifestations of syndromes or disorders. Light physical punishment is conceived as "therapeutic" by a large number of teachers. Also, many respondents to a large poll cited "physical exercise" as a viable alternative to medication (11). In short, acceptance of ADHD

as a biomedical condition and of medications as a primary treatment has been slow. Intriguingly, ADHD has been recently noted in indigenous children from the Brazilian Amazon who were presenting with behavioral problems (12).

#### *Canada*

Substantial evidence exists that Canadian health professionals view ADHD as an impairing, often life-long disorder that requires careful assessment and multimodal intervention. Canadian experts in ADHD from all provinces, specialties, and languages have formed a network organization called the Canadian Attention Deficit Disorder Resources Alliance or CADDRA, which sponsors an annual conference and a Web site ([www.caddra.ca](http://www.caddra.ca)), advocates with government and schools, and produces continuously updated practice guidelines. It has also developed an "ADHD Toolkit" to facilitate provision of standardized treatment by primary care practitioners as well as specialists, with particular focus on the treatment of adults. Family doctors and pediatricians have the option to refer patients with complex treatment needs to ADHD centers of excellence. The geography of the country requires the provision of care over long distances, through the use of e-health, telehealth, and outreach and by transporting patients by air when necessary.

The nationalized health care system makes both medication treatment and a wide range of psychosocial interventions accessible to the general population. Nevertheless, there is no distinct designation of ADHD within the education system. A child with ADHD will usually receive an individual education plan; however, the school does not receive additional funds as it does for autism. Although treatment of adults with ADHD is increasing rapidly, there are no dedicated hospital clinics for this population, leading to a situation in which adults with ADHD continue with pediatric providers.

#### *China*

Prevalence estimates of ADHD in China range widely, from 1% to

nearly 14% (13,14). Because only several hundred professionals are available nationwide for a child and adolescent population of approximately 250 million, ADHD is greatly underdiagnosed and undertreated. Because of the cultural acceptance of herbal treatments, they are used as much as, if not more than, stimulant medications.

During the Cultural Revolution, education in schools was undervalued, at the expense of physical work. Indeed, students were pulled from their studies to work in the countryside. More recently, however, one-child policies, economic development, and education have all been prioritized. As a result, children have been under strong pressure to achieve at high levels in all subject areas, and problems with attention and deportment have become quite salient in classroom settings. Attention and behavior problems may be exacerbated by strong cultural expectations for achievement, the predominant practice of passive student learning in lecture-style classrooms, and stressful parent-child interactions related to high achievement expectations. Because the prevailing culture assumes that the child must conform to the school, provision of individualized education plans is not culturally acceptable.

Also salient in China are high levels of stigma related to mental illness, a lack of training in the treatment of ADHD among medical and mental health professionals, and strong controls on potentially addictive medications such as stimulants. Indeed, the Shanghai Health Bureau and relevant insurance regulations enforce a policy of a maximum of two weeks for any methylphenidate prescriptions, meaning that follow-up every two weeks is necessary (15). Such stringent guidelines curtail use of this intervention.

### *Germany*

In German there is a trend toward increasing awareness and detection of ADHD among children and adolescents (16,17). The treated prevalence of patients with ADHD medications more than doubled between 2003 and 2008, raising concerns and

debate about the quality of clinical diagnoses as well as possible overtreatment. As in the United States, most patients are males, with the peak prevalence rate among nine-year-old boys. Immediate-release formulations have been largely replaced by extended-release medications. It is noteworthy that direct medical costs for patients with ADHD, from the perspective of statutory health insurance, exceed those of matched control patients without ADHD by a factor of more than 2.5—a finding that parallels results of cost studies in the United States (18–21). In addition, a diagnosis of ADHD is associated with substantial indirect costs (22).

### *Israel*

The sociocultural diversity of the population of Israel appears to play a major role in the reported prevalence rates of ADHD. For instance, a recent, extensive epidemiological survey of psychopathology among Israeli adolescents reported an overall ADHD prevalence rate of 3%. However, the rates were 3.4% for the Jewish sample and only 1.2% for the Arab sample (5). Similar disparities between Jewish and Arab populations have been reported for medication treatment of ADHD (23). Indeed, mental health services are more available in Jewish localities, and unmet needs for services are greater in Arab localities (24). Thus, it is difficult to determine whether differences in prevalence rates are attributable to true differences in the manifestations of ADHD or to differences in awareness and in availability of resources.

Overall, the high tolerance for excessive activity in Israeli classrooms makes it difficult to distinguish high activity from pathologic manifestations. However, because of the high value placed on achievement, rates of referrals from schools are high.

### *Netherlands*

The prevalence of ADHD in the Netherlands is highly comparable to that reported in North America, both for children and, to some degree, adults. The main population-based prevalence studies were conducted

with *DSM-III* and *DSM-III-R* criteria, and no large-scale epidemiological studies have used the *DSM-IV* subtypes.

Treatment has moved from essentially no pharmacological intervention in the 1980s to a mixed-modality model (medication and psychosocial intervention). Biases concerning pharmacological intervention remain, although nonstimulant medication has proved clinically useful in this respect. Formal national figures on the prevalence of nonpharmacological interventions have not been reported.

Reimbursement is through national health insurance and private insurance. Although there are special privileges for children with learning disorders, this is not the case for youths with ADHD. A key area of poor coordination of services is the transition of adolescents with ADHD to adult psychiatric services. This fragmentation is being addressed by professional education but not as yet with formal mechanisms of transfer to adult care.

### *Norway*

The number of children and adolescents in Norway who receive an ADHD diagnosis has increased substantially in recent years, as has the prescription of medication to such youths. From 1996 to 2009 prescription of ADHD medications increased nearly 20-fold. A ten-year governmental effort (1998–2008) focused on mental health has resulted in increased awareness and acceptance of ADHD but has also spurred debate about quality of diagnosis and potential overtreatment, both among clinicians and in the general public.

Even though governmental consensus recommendations are delivered to all relevant clinical settings (25), there are large geographical differences in estimated prevalence rates, which vary between counties from four to 68 per 1,000 inhabitants under age 19 (26). Expenditures related to treatment of ADHD have not yet been a major issue in Norway.

### *United Kingdom*

The prevalence rate of hyperactive behavior in the United Kingdom has

been fairly steady over the past 50 years (27). Prevalence studies have suggested no great increase in the frequency of hyperkinetic disorder since the 1970s, with estimates of about 2.4% (28,29). In contrast, recognition and diagnosis in actual clinical practice were extremely low more than 20 years ago but increased rapidly during the 1990s. Approximately .3% of the child population is currently treated (30). Recognition was initially kept low by a disinclination to prescribe stimulants and by a tendency to diagnose conduct problems instead (31); it increased with epidemiological evidence and pressure from service user groups. NICE has provided detailed guidelines for treatment of children, adolescents, and adults (32). Indeed, treatment in adults is rising rapidly.

Services are paid for by the National Health Service and provided by psychiatrists, pediatricians, psychologists, nurses, occupational therapists, and others, often working in multidisciplinary teams. Referral to specialized services usually comes from primary health care and is largely dependent on parents' knowledge of ADHD and the pressure they place on primary care providers (33). The education system does not provide resources on the basis of ADHD *per se*; such resources follow instead from educational assessment.

## Conclusions

The prevalence of ADHD varies across nations, but most of the variation in standardized case finding can be attributed to disparate diagnostic practices and algorithms (3). Far larger international variability exists with respect to treated prevalence and treatment procedures, and information in this report reveals how social context—including historical, cultural, and economic factors—greatly influences perceptions, diagnoses, and treatments related to ADHD. Cultural stigma, along with divergent professional training and belief systems, affects choice of treatment models. Even as all nations have witnessed large increases in use of medication, and even as evidence-based psychosocial treatments have gained credence, there is still a major

struggle to provide optimal care. Because of the great need for evidence-based treatments for the long-term impairments related to ADHD, we call for culturally sensitive research to enhance understanding of both across-nation and within-nation variability in intervention procedures and access to treatment.

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