



that are associated with long-term outcomes (quality of evidence grade B, strong recommendation).

4. Treatment of complex ADHD should include evidence-based approaches that address ADHD and account for coexisting conditions while respecting family background and preferences. Although behavioral and educational approaches serve as the foundation for intervention, it is often necessary to combine these approaches with pharmacological treatments. Treatment should focus on areas of functional impairment, not just symptom reduction, by incorporating developmentally appropriate strategies for self-management, skill building, and prevention of adverse outcomes (e.g., substance use, conduct problems, depression/anxiety, suicidal ideation, educational failure) (quality of evidence grade C to B, recommendation).
5. Given that ADHD is a chronic condition that often persists into adulthood, treatment of complex ADHD should include ongoing, scheduled monitoring of patients throughout the lifespan, commensurate with the individual patient's needs and profile, with particular emphasis on preparing for key developmental transitions (preschool to school, elementary to middle school, middle to high school, and high school to postsecondary education or employment) (quality of evidence grade B, strong recommendation).

## INTRODUCTION

This document is the first clinical practice guideline from the Society for Developmental and Behavioral Pediatrics (SDBP), whose mission is, "Improving the health and wellbeing of children and their families by supporting interdisciplinary professionals to advance the field of developmental and behavioral pediatrics."<sup>1</sup> In keeping with its mission, the SDBP Board of Directors charged the attention-deficit/hyperactivity disorder (ADHD) Guideline Panel (the "Panel") to develop a guideline that focuses on children with "complex ADHD," is not specific to any discipline, complements existing primary care ADHD practice guidelines (i.e., those published by the American Academy of Pediatrics), and promotes high-quality, evidence-based, subspecialty level care for patients who need it. To meet the needs of children and adolescents with complex ADHD, this guideline focuses on a number of issues, each of which is discussed below.

### Defining Complex Attention-Deficit/Hyperactivity Disorder

The Panel began its work by gathering information to define "complex ADHD." This process included a survey of SDBP membership that identified 3 categories of coexisting conditions (medical, psychiatric, and developmental/learning) that complicate the assessment and treatment of children and adolescents with ADHD. The Panel then completed a prioritization exercise to rank order the significance of coexisting conditions and other factors

that increase the complexity of ADHD and contribute to adverse functional outcomes. We defined "complex ADHD" based on age (<4 years or presentation at age >12 years), presence of coexisting conditions (neurodevelopmental, mental health, medical, or psychosocial factors adversely affecting health and development), moderate to severe functional impairment, diagnostic uncertainty, or inadequate response to treatment (see Key Action Statement 1).

## KEY CONCEPTS AND DEFINITIONS

### Focus on Functional Impairment to Improve Long-term Outcomes

Attention-deficit/hyperactivity disorder is associated with impairment in multiple functional domains (behavioral, social, and academic) across settings (home, school, peers, community). These impairments place children with complex ADHD at substantially increased risk for adverse long-term outcomes in adulthood that similarly include multiple domains (educational, economic, interpersonal relationships, mental health). Treatment for children and adolescents with complex ADHD should focus on improvement in function, with the goal of improved long-term functional outcomes, not merely improvement in core ADHD symptoms. Key functional impairments associated with childhood ADHD (e.g., parent-child interactions, school functioning, peer relationships) are also key predictors and mediators of functional difficulties in adulthood (e.g., relationships with family, peers, and coworkers; limited educational attainment; vocational and financial difficulties; personal independence; substance use). Therefore, this guideline emphasizes the identification of functional impairments in children and adolescents with ADHD, monitoring of the patient's functional status over time, and implementation of treatments that specifically target functional impairment.

### Psychosocial Treatment Is Foundational for Treatment of Complex Attention-Deficit/Hyperactivity Disorder

Complex ADHD, by definition, is most often associated with other neurodevelopmental and mental health conditions that compound the impact of ADHD on function in multiple domains. Although pharmacological treatment for ADHD has been demonstrated to improve *current* core symptoms<sup>2</sup> and, to a lesser extent, function (e.g., test performance, peer interactions) and adverse coexisting conditions or circumstances (e.g., criminality,<sup>3,4</sup> depression,<sup>5-7</sup> substance use disorder [SUD],<sup>8</sup> motor vehicle accidents,<sup>9-11</sup> and other physical injuries),<sup>12</sup> there is limited evidence for improvement in long-term *outcomes* with psychosocial (i.e., behavioral and educational) or pharmacological treatment. Nevertheless, evidence-based psychosocial interventions directly address key domains that are impaired in children and adolescents and that are related to long-term outcomes (e.g., educational, vocational, interpersonal). Thus, evidence-based psychosocial interventions have the potential to improve academic and

interpersonal skills, family relationships, and environmental contexts to support development, thereby contributing to improved long-term outcomes. This guideline therefore recommends implementation of evidence-based psychosocial treatments, targeting areas of functional impairment, as the foundation for treatment of children and adolescents with complex ADHD. We recognize that logistical considerations such as availability of services, family preferences, and other factors will impact the implementation of psychosocial and pharmacological treatment.

### **Shared Decision-Making and Clinical Judgment**

Research on effective treatment for complex ADHD, particularly for children with ADHD and coexisting conditions, is limited. There are multiple evidence-based psychosocial and pharmacological treatments for the core symptoms of ADHD, conditions that often coexist with ADHD, and associated functional impairments. This guideline therefore emphasizes a data-based, sequential approach, using evidence-based psychosocial and pharmacological treatment, incorporating shared decision-making among the child/adolescent, parents/guardians, and clinician, all informed by the clinical judgment of clinicians and expertise of other professionals (e.g., educators) who are collaborating on the child or adolescent's treatment.

### **Interprofessional Care**

Developmental-behavioral pediatricians, psychologists, and nurse practitioners who comprise the membership of the SDBP are often asked by primary care clinicians or parents/guardians to provide subspecialty level diagnostic and treatment services to children and adolescents with "complex ADHD."<sup>13</sup> Child neurologists, child psychiatrists, and other clinicians with specialized training and/or experience also provide care for these patients. Psychosocial treatments require collaboration with the child or adolescent's teacher and other school personnel. Optimal diagnostic and treatment services for complex ADHD require the expertise of professionals from multiple disciplines working together to meet the medical, psychological, and educational needs of affected children and adolescents. Thus, this guideline is intended to be used by clinicians from multiple health care and education disciplines.

### **Psychological Testing and Mental Health Diagnostic Assessment**

In this guideline, the term "psychological testing" refers to an assessment that primarily consists of formal measures of cognitive ability and academic achievement. By contrast, "neuropsychological testing" includes additional direct assessments of cognitive processes (e.g., memory, executive function), which is often appropriate for children suspected of having specific neurological conditions (e.g., traumatic brain injury, central nervous system tumors).

Mental health diagnostic assessments typically include diagnostic interviews (informal or structured) along with standardized questionnaires that assess a broad range

of disorders or specific conditions such as anxiety or depression.

### **Modality of Treatment and Multimodal Treatment**

For the purposes of this guideline, treatment modalities for complex ADHD are divided into 2 main categories—psychosocial and pharmacological. Each modality may include 1 or more specific interventions (e.g., psychosocial treatment includes behavioral parent and youth training as well as educational interventions; pharmacological treatment includes different medication categories). It is often necessary to use multiple specific types of intervention within a single treatment modality (e.g., educational intervention plus behavioral parent training; less commonly, 2 classes of medication). "Multimodal treatment" refers to the combination of psychosocial and pharmacological treatments to address ADHD symptoms and functional impairments.

### **Evidence-Based Psychosocial Interventions**

In this guideline, we use the term "evidence-based psychosocial interventions" specifically to refer to behavioral, educational, and psychological interventions and treatment that have been shown to improve function and/or expression of core ADHD symptoms in children and adolescents with ADHD. Other approaches that are often provided to children and adolescents with ADHD but for which there is inadequate evidence (e.g., play therapy, dietary supplements, occupational therapy, classroom accommodations) are not included as evidence-based interventions in this guideline.

### **Coexisting Conditions**

The medical term "comorbidity" is frequently used to describe conditions that are often associated with ADHD. However, this guideline employs a broader perspective on the conditions that define complex ADHD, including neurodevelopmental disorders (e.g., genetic disorders, autism spectrum disorder), mental health disorders, and socioeconomic factors (e.g., poverty). We therefore use the term "coexisting conditions" to refer to these disorders and factors associated with ADHD.

### **Life Course Perspective**

Attention-deficit/hyperactivity disorder is often mistakenly viewed as merely a constellation of childhood behaviors that can create challenges in the home, school, or community. This guideline is informed by research that clearly demonstrates that ADHD is, in fact, a chronic neurodevelopmental disorder that is often accompanied by complex coexisting conditions,<sup>14-18</sup> is associated with impairment in multiple domains, typically persists into late adolescence and often into adulthood,<sup>19-22</sup> and may lead to adverse, long-term outcomes including mental health disorders,<sup>23,24</sup> educational failure,<sup>25,26</sup> vocational underachievement,<sup>24,26</sup> SUDs,<sup>19,27,28</sup> poor relationships with family and other adults, legal problems,<sup>29-32</sup> and increased risk for early death.<sup>19</sup> A "life course perspective"

for assessment and treatment should be similar to the approach taken with other serious, chronic health conditions that are identified in childhood, such as diabetes mellitus. Psychosocial treatments may help lay the foundation for improved function in multiple domains that will impact persons with ADHD throughout their lives (e.g., peer interactions, executive function).<sup>33</sup> This life-course treatment approach requires the expertise of multiple professionals from multiple systems, working with children and their families, with access to evidence-based psychosocial and pharmacological treatment to ensure the best possible outcome for every child with ADHD over his or her entire lifetime.

## METHODOLOGY

The Board of Directors of the Society for Developmental and Behavioral Pediatrics (SDBP) appointed a chair and Panel members representing the SDBP attention-deficit/hyperactivity disorder (ADHD) Special Interest Group, SDBP Practice Committee, SDBP Research Committee, Children and Adults with Attention Deficit/Hyperactivity Disorder (parent representative), and the American Psychological Association. The Panel participated in regular phone conferences beginning in September 2016 to review the charge from the SDBP and to gather information to establish the definition of complex ADHD, before the first in-person Panel meeting in January 2017. Three subsequent in-person meetings were held in May and October 2017 and March 2018, with regular interim and subsequent phone conferences and electronic communication.

### Development of Key Action Statements

In keeping with the SDBP Board of Directors charge, the Panel first completed a formal process to define “complex ADHD” (see above) to establish the scope of the guideline. The Panel reviewed current ADHD practice guidelines as well as the American Academy of Pediatrics (AAP) and the Institute of Medicine standards for the development of clinical practice guidelines.<sup>34-38</sup> Subsequently, Key Action Statements (KASs) were developed, consistent with the format of the AAP ADHD clinical practice guideline.<sup>36</sup> In addition to defining the scope and “entry point” (KAS 1), KASs were developed for assessment (KAS 2), psychosocial treatment (KAS 3), multimodal treatment of ADHD and coexisting conditions (KAS 4), and long-term monitoring (KAS 5). Subcommittees were established to complete detailed drafts of each KAS, based on published evidence and consensus expert opinion of Panel members. The final KAS statements were reviewed and approved by the entire Panel.

### Literature Review and Evidence Grading

The Panel began by examining the evidence reviews that were completed in support of the 1999, 2000,<sup>39</sup> and 2011 AAP ADHD practice guidelines<sup>40</sup> and the Agency for Health Care Research and Quality evidence review

for the most recent update to the AAP ADHD practice guidelines.<sup>41</sup> We also examined the systematic reviews reported periodically by the Society of Clinical Child and Adolescent Psychology of the American Psychological Association.<sup>42-45</sup> In addition, Panel members used their broad, transdisciplinary experience as expert clinicians, parents, and researchers in the field to guide further development of the KAS drafts.

The KAS subcommittees assembled the literature from previously published evidence reviews and studies identified through specific, supplemental searches related to the content of the KASs. This was supplemented by preliminary results from a comprehensive meta-analysis of the psychosocial literature that was conducted concurrently to the Panel’s evidence review (W. Pelham, G. Fabiano, written personal communication, June 19, 2019). Published articles were organized into evidence grading tables for each KAS. Studies that had previously been reviewed and graded for the AAP guidelines were not rereviewed; the Panel adopted the published grading for each of these studies.<sup>39-41</sup> For each of the remaining cited studies, a review was completed using a review algorithm based on the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool for Quantitative Studies.<sup>46</sup>

Each study was evaluated and graded by 2 reviewers, comprising volunteer members of the SDBP ADHD Special Interest Group, SDBP Research Committee, and ADHD Guideline Panel. Reviewers received training in use of the EPHPP tool from Panel members with expertise in epidemiology and research methodology. In cases of disagreement between the 2 initial reviewers, a third review was completed by a Panel member (see SDBP Complex ADHD Guideline Evidence Tables).

Overall strength of evidence for each KAS was assigned based on the grading as described above using the same approach as for the 2011 AAP ADHD practice guideline.<sup>36</sup> Thus, action statements were given a “strong recommendation” (grade B) or “recommendation” (grade C) if there was a high to moderately high quality of evidence and a preponderance of benefit over harm.<sup>38</sup> “Option level” action statements, in contrast, are supported by lower quality or limited evidence combined with the consensus expert opinion of the Panel. The limited, published evidence related to multimodal and/or combined treatment for ADHD plus coexisting conditions required that the Panel use its collective clinical and scientific expertise to develop details of KASs related to these clinical scenarios. Thus, “option level” action statements should be viewed as guidelines that may be considered by clinicians based on their knowledge of their patient with complex ADHD and their clinical judgment. Assignment of the strength of evidence for each KAS was based on consensus of the Panel members led by a Panel member with significant experience in healthcare quality.

The implementation algorithms that accompany this guideline include a level of detail that goes beyond the summary information contained in the KASs (see SDBP Complex ADHD Process of Care Algorithms). It was not

possible to assign the strength of evidence for the algorithms, given the paucity of specific studies related to each of the steps in the care process. Therefore, although the Panel examined relevant, published evidence, the algorithms primarily reflect the consensus expert opinion of the Panel.

## Development of Guideline Implementation Algorithms

The Panel reviewed existing ADHD guidelines, including published guidelines, unpublished institutional guidelines and algorithms, and relevant literature, in an effort to ensure that careful consideration was given to all available information on the assessment and treatment of children and adolescents with complex ADHD. The algorithms reflect both this rigorous review and the expert consensus opinion of the Panel members. Algorithms were developed to provide specific guidance on the assessment of complex ADHD, psychosocial and pharmacological treatment, preschool-aged children, and treatment of ADHD accompanied by coexisting conditions (i.e., autism spectrum disorder, tics, substance use disorder, anxiety, depression, disruptive behavior disorders).

## Guideline Review

A draft of the guideline and algorithm document was completed in July 2019, after which the guideline underwent a formal review by a review panel from the SDBP ADHD Special Interest Group. Comments were also solicited from the membership of the SDBP. The draft guideline and algorithms were revised by the Panel chair in response to these initial reviews. The revised versions were reviewed and approved by the entire Panel after which a final review and approval were provided by the SDBP Board of Directors.

## CONTEXT

The American Academy of Pediatrics (AAP) attention-deficit/hyperactivity disorder (ADHD) clinical practice guideline states that, "...some primary care clinicians might not be confident of their ability to successfully diagnose and treat ADHD in a child because of the child's age, coexisting conditions, or other concerns."<sup>36</sup> In these situations, the AAP guideline recommends referral to "a pediatric or mental health subspecialist." The Society for Developmental and Behavioral Pediatrics guideline is intended to complement the AAP practice guidelines by providing a framework for the assessment and treatment of these children and adolescents with complex ADHD by clinicians with specialized training or expertise.

## KEY ACTION STATEMENTS FOR THE ASSESSMENT AND TREATMENT OF CHILDREN AND ADOLESCENTS WITH COMPLEX ATTENTION-DEFICIT/HYPERACTIVITY DISORDER

**Action statement 1: The clinician with specialized training or expertise should initiate a comprehen-**

**sive assessment and develop an interprofessional, multimodal treatment plan for any child or adolescent through age 18 years with suspected or diagnosed complex ADHD with functional impairments upon referral from a primary care clinician. Complex ADHD is defined by any of the following:**

- Aged <4 years or >12 years at the time of initial presentation of symptoms or impairment
- Presence or suspicion of coexisting disorders and complicating factors:
  - Other neurodevelopmental disorders (e.g., global developmental delay, intellectual disability [ID], autism spectrum disorder [ASD], speech and language disorders, tic disorders)
  - Significant problems with the acquisition of academic skills including specific learning disorders (LDs) (i.e., reading, math, written language)
  - Mental health disorders (e.g., depression, anxiety, oppositional defiant disorder, conduct disorder, substance use disorders [SUDs], eating disorders)
  - Chronic medical conditions (e.g., history of extreme prematurity, epilepsy, cancer, traumatic brain injury, motor disabilities, fetal alcohol spectrum disorders)
  - Genetic disorders (e.g., Down syndrome, Fragile X syndrome)
  - Complicated psychosocial factors (e.g., adverse childhood experiences such as trauma, neglect and poverty; parental mental health disorders)
- Moderate to severe functional impairments in important aspects of daily living (e.g., relationships with family and peers, activities of daily living)
- Diagnostic uncertainty on the part of the primary care clinician
- Inadequate response to treatment (or uncertainty about treatment planning)

## Evidence Profile

- *Aggregate evidence quality:* Grade B
- *Benefits:* ADHD is usually accompanied by coexisting disorders and other complicating factors that may not be identified or adequately treated. Coexisting disorders that give rise to greater severity of functional impairments place children with ADHD at greater risk for adverse long-term outcomes; in addition, these children may not respond adequately to standard treatment that is typically available in the primary care setting and the local community. Diagnosis and treatment of children aged <4 years or >12 years at the time of initial presentation are either not covered under current primary care guidelines or present challenges that often require a specialized level of care.
- *Harms/risks/costs:* Coexisting disorders may be missed unless a comprehensive assessment is completed and may not be adequately treated unless a

comprehensive, interprofessional approach is used. Access to specialized assessment and treatment may be limited in some locations. Specialized care may be associated with additional short-term costs.

- **Benefits-harms assessment:** Children and adolescents with “complex ADHD” as defined in this practice guideline are at higher risk for severe impairment in daily life functioning and activities of daily living and for adverse long-term outcomes, including mental health disorders, educational failure, chronic financial dependence, SUDs, legal problems, chronic health problems, and risk of early death from suicide or accidents. Appropriate interprofessional assessment and evidence-based treatment approaches are essential to ensure the best possible outcomes for children and adolescents with complex ADHD. Prevention of severe, adverse, long-term outcomes and their associated costs may outweigh the increased short-term costs associated with specialized care for children and adolescents with complex ADHD.
- **Value judgments:** Primary care ADHD practice guidelines include recommendations to refer certain patients with ADHD who present diagnostic challenges, have failed to respond to treatment, or have coexisting disorders or other complicating factors. Children and adolescents with complex ADHD require a higher level of care, including longer visit times, and therefore require the expertise of clinicians with specialized training and/or experience, who strive to provide interprofessional care based on guidelines that address common coexisting disorders and other complicating factors. Prevention of severe, adverse, long-term outcomes and their associated costs may outweigh the increased short-term cost associated with specialized care for complex ADHD.
- **Role of patient preferences:** The care of children and adolescents with complex ADHD should be based on shared decision-making (SDM) with parents/guardians and patients, using a culturally sensitive approach, to maximize the chance of successful treatment and outcomes. Family concerns about needing a higher level of expert care for their child should be acknowledged. Parents may also be concerned about potential harms of diagnostic labeling and discussion of sensitive family issues during the assessment and treatment process.
- **Exclusions:** Less complicated ADHD or complex ADHD with milder functional impairment may be diagnosed and managed by primary care clinicians using existing primary care ADHD guidelines.
- **Intentional vagueness:** This guideline is intended to be useful to clinicians from multiple disciplines (e.g., developmental-behavioral pediatrics, clinical child and adolescent and school psychology, child neurology, child and adolescent psychiatry, pediatrics, adolescent medicine, family medicine) and educational professionals who have specialized training

and/or expertise that equips them to provide care for children and adolescents with complex ADHD.

- **Strength:** Strong recommendation

The most recent version of the Clinical Practice Guidelines for the diagnosis, evaluation, and treatment of children and adolescents with ADHD from the AAP applies to children aged 4 to 18 years.<sup>36</sup> Children younger than 4 years may present with hyperactive/impulsive and inattentive behaviors consistent with the diagnostic criteria for ADHD.<sup>47</sup> However, the range of typical behavior in this age group is broad. Furthermore, it is often difficult to determine the underlying cause for behaviors that may suggest a diagnosis of ADHD,<sup>48</sup> and there is limited evidence-based treatment for children with ADHD younger than 4 years.<sup>49,50</sup> By definition, symptoms of ADHD must be present before the age of 12 years; however, in some children, a formal diagnosis of ADHD may not have been made by that age. Older children with ADHD are also more likely to have 1 or more coexisting learning or mental health conditions, further complicating the diagnostic assessment.<sup>14-16,51</sup>

Children with neurodevelopmental disorders and ADHD present significant diagnostic and treatment challenges. In children with significant developmental delay or ID, it may be difficult to determine the extent to which hyperactive/impulsive or inattentive behaviors indicate a diagnosis of ADHD or if they reflect the child’s developmental level. Children may develop significant behavioral problems in association with communication impairments, complicating the diagnosis of ADHD in this population. Although the DSM-5 specifically allows for coexisting ADHD and ASD, the developmental, communication, and behavior problems that define ASD make it difficult to determine whether an additional diagnosis of ADHD is warranted.<sup>47</sup> Children with coexisting ADHD and ASD typically require more intensive, combined, and multimodal intervention and, in some cases, may not respond well to pharmacological treatment.<sup>52,53</sup>

Approximately one-half to two-thirds of children with ADHD have 1 or more coexisting LDs in reading, writing, and/or math.<sup>14,15,51,54</sup> Assessment of children and adolescents with known or suspected coexisting LDs may require more detailed, formal psychoeducational testing than can be provided in the primary care setting. Treatment requires the interpretation of psychological test results, development of multimodal treatment plans, and review of school services, progress reports, and Individualized Education Program (IEP)<sup>55</sup> plans.

Coexisting mental health disorders, which occur in over half of children and adolescents with ADHD, present some of the most significant diagnostic and treatment challenges.<sup>16</sup> In-depth, interprofessional assessment may be required to assess the relative significance of ADHD versus the coexisting mental health disorder and to identify the most important functional impairments as targets for intervention and treatment. Simultaneous treatment with multiple psychosocial interventions and

on occasion more than 1 psychopharmacological agent may be required.

Attention-deficit/hyperactivity disorder may occur in children with chronic medical or genetic disorders. It is often difficult to assess potential ADHD symptoms in the context of chronic illness or conditions that have a global impact on development and behavior (e.g., Down syndrome). Other conditions may present treatment challenges such as unpredictable response to medications (e.g., fetal alcohol spectrum disorders) or increased potential for side effects (e.g., ID, ASD, and epilepsy).<sup>52,53</sup>

Children with ADHD who do not have confirmed or suspected coexisting conditions such as those outlined above may nonetheless present with diagnostic or treatment challenges. It may be difficult to diagnose ADHD and to implement a treatment plan for children who have suffered abuse or neglect and/or other trauma or whose families are living in poverty or experiencing mental health disorders.<sup>56,57</sup> If a child or adolescent with ADHD has severe impairment in 1 or more functional domains (e.g., academic failure, disrupted family function, poor peer interactions), successful treatment is likely to require multiple modalities (i.e., behavioral treatment and medication), more intensive services, supports to promote intervention engagement, and therefore more clinician time and expertise.

Although most children and adolescents with ADHD benefit from evidence-based psychosocial and pharmacological treatment, some children fail to respond as expected and may require consideration of more intensive or complex treatment approaches. Inadequate response to treatment may be characterized by poor control of core ADHD symptoms, persistent impairment in function despite improvement in core symptoms, occurrence of significant side effects to medication, or challenges with implementation of treatment because of child/adolescent (e.g., variable treatment acceptance, poor adherence), family (e.g., parental conflict over treatment decisions), or systems issues (e.g., lack of appropriate school supports or services, limited access to behavioral services, lack of awareness of services that may be provided in different states or communities). As with other chronic medical conditions, we recommend that primary care clinicians consider referring children for specialized care when they determine that response to treatment has been inadequate. It is also essential that insurers recognize the medical necessity of these referrals. Some primary care clinicians may have the additional training, experience, and expertise required to treat these more complex patients.

### Special Circumstances

Some children with ADHD and coexisting conditions who respond well to treatment provided by their primary care clinician and maintain good function may not require referral for specialized care.

Parents may choose to have their child or adolescent with ADHD seen by a subspecialist because of their own concerns about coexisting conditions, response to treatment, or confusion about treatment options. Parental/patient choice is fundamental to our health-care system and should be respected when it involves diagnosis and treatment of ADHD.

### Comments for Implementation

Assessment and treatment of complex ADHD depends on access to expert clinicians, interprofessional diagnostic teams, and evidence-based psychosocial and pharmacological treatment. In some locations, there are few or no clinicians who are able to provide this level of care. More subspecialists are needed in the disciplines that provide this care, and primary care clinicians, community mental health staff, and school personnel must receive additional training to meet the needs of patients with ADHD.<sup>58</sup>

Insurance coverage for diagnostic services, particularly psychological assessment, is often limited or non-existent. Psychosocial treatment may not be covered or only covered if received from a limited panel of clinicians, and only a narrow range of treatments may be covered. This persistent inequity in our healthcare system must be addressed to meet the needs of children and adolescents with complex ADHD.<sup>59</sup>

Integrated, interprofessional care may require electronic systems to support communication and care coordination.<sup>60-62</sup>

**Action statement 2: In the evaluation of a child or adolescent with complex ADHD, the clinician should verify any previous diagnoses and assess for coexisting conditions employing an evidence-based approach that is developmentally appropriate, culturally sensitive, and inclusive of data from multiple settings and sources (home, school, community). The evaluation should include an appropriate, comprehensive medical history and physical examination, and psychological assessment based on the child's presenting problems and their severity, functional impairments, cognitive/developmental level, and the judgment of the treating clinician.**

### Evidence Profile

- *Aggregate evidence quality:* Grade B
- *Benefits:* Confirming the diagnosis, identifying coexisting disorders and other problems, and accounting for impairments across settings are necessary to develop appropriate and effective treatment plans for children and adolescents with complex ADHD. The high rate of coexisting disorders and a variety of other problems associated with ADHD makes it imperative to conduct an appropriately comprehensive medical and psychological assessment. Early identification and treatment of coexisting disorders and other problems may decrease the risks for

serious, adverse long-term outcomes. Determining the reasons for failure to respond to previous treatments will facilitate implementation of effective treatment.

- *Harms/risks/costs*: Comprehensive assessment may increase short-term cost, risk for inaccurate diagnosis of complex coexisting disorders, and stigma related to mental health diagnoses.
- *Benefits-harms assessment*: The benefits of appropriately comprehensive assessment of children and adolescents with complex ADHD should be considered in the context of the significant, long-term costs of inaccurate diagnosis, inaccurate assessment of functional impairments, and failure to provide treatment that may reduce the risk of lifelong adverse outcomes. These benefits outweigh any potential harm related to the assessment.
- *Value judgments*: Comprehensive assessment resulting in accurate diagnosis and effective treatment is necessary to optimize the potential benefits for patients, families, and society. Findings from the diagnostic assessment should be linked directly to a comprehensive treatment plan that focuses on the child's difficulties in daily life functioning in home, school, and peer settings.
- *Role of patient preferences*: See Key Action Statement (KAS) 1.
- *Exclusions*: None.
- *Intentional vagueness*: It is not possible to recommend a uniform assessment protocol for every child with complex ADHD. Rather, assessment should be based on clinical judgment, taking into account the efficacy of any previous treatments, the severity of a child's functional impairments, and the nature and severity of coexisting conditions.
- *Strength*: Strong recommendation

Children and adolescents with complex ADHD, as defined in this guideline, present with a variety of complicating factors that require more comprehensive assessment than is recommended for assessment of ADHD in the primary care setting.<sup>36</sup> When a comprehensive assessment, including psychological testing and mental health diagnostic assessment is conducted, coexisting learning and mental health conditions are identified in over 70% of the school-age children with ADHD.<sup>63</sup>

For children younger than 4 years or those with other suspected neurodevelopmental disorders (e.g., ID, LDs, ASD) or other coexisting conditions, it is essential to accurately assess developmental and cognitive status and functional impairments using standardized assessments that can best be administered by psychologists, developmental-behavioral pediatricians, and school psychologists. Children and adolescents with ID, LDs, or ASD are more likely to have ADHD than their typically developing peers.<sup>18,64</sup> ADHD symptoms cannot be evaluated in these children without data from formal cognitive/developmental testing and, in the school-age

child, academic achievement testing and assessment of classroom functioning. For some children who present with challenging behaviors that are presumed to be due to ADHD, in-depth assessment may reveal previously undiagnosed cognitive or learning problems.<sup>63</sup> An adequate assessment includes a focus on the child's functional impairments in home, school, and peer settings because the child's functional difficulties will drive treatment planning and monitoring. Children with severe functional impairment despite treatment in the primary care setting may have 1 or more unidentified coexisting conditions.<sup>8,14-16,63</sup> Thus, assessment should include broad-band parent and teacher ratings of ADHD symptoms and functional impairments. In the school setting, a functional behavioral assessment of classroom functioning may be required to determine the child's needs and appropriate placement/accommodations.

Children and adolescents with ADHD and coexisting LDs may require additional psychological assessment with psychological testing beyond what is typically provided by schools, particularly if there is evidence of poor academic function despite efforts to apply educational accommodations/interventions that might include special educational services.

Coexisting mental health disorders place children and adolescents with ADHD at significant increased risk for adverse long-term outcomes and can only be assessed and treated by an interprofessional team of medical and mental health clinicians (E. Harstad, S. K. Katusic, G. Sideridis, et al. Childhood ADHD is linked to adverse outcomes in all functional domains, written personal communication, Manuscript under Review, 2019). Assessment of ADHD can be difficult for children and families living in poverty or experiencing other psychosocial challenges, potentially leading to inaccurate diagnosis.

When diagnostic uncertainty remains after primary care assessment or if there has been a poor response to treatment (i.e., when significant, residual functional impairment remains in home and/or school), children with ADHD should be referred by their primary care clinician for comprehensive assessment and implementation of integrated, multimodal treatment.

### Special Circumstances

It may be difficult to obtain reliable information in certain situations (e.g., family stress, parental mental health problems, adoption, foster care). The assessment of ADHD symptoms is particularly difficult in children with ID or ASD.

### Comments for Implementation

Clinicians with specialized training or expertise should review available information to determine the appropriate assessment for each patient. As with other serious, chronic medical conditions, insurance coverage should be provided for services that are deemed necessary based on the available information and the clinical judgment of the treating clinician. The assessment of children and



adolescents with complex ADHD will generally require comprehensive medical and psychological evaluation, including psychological testing and mental health assessment. Neuropsychological testing is generally required when there is evidence of central nervous system involvement (e.g., traumatic brain injury, brain tumor, stroke). The treating clinician should work closely with appropriate personnel from the child's school to maximize the likelihood of appropriate interventions in the school setting. Care should be taken that an assessment is not curtailed merely because of time constraints or systems barriers, prior authorization requirements, or pressures for expedited diagnosis or medication treatments that may not be in the child's best interest.

**Action statement 3: Psychoeducation about ADHD and its coexisting conditions and evidence-based behavioral and educational interventions are foundational for the treatment of complex ADHD and should be implemented at the outset of treatment whenever possible. Evidence-based behavioral and educational interventions (e.g., behavioral parent training [BPT], behavioral classroom management [BCM], behavioral peer interventions [BPIs], and, for older children, organizational skills training [OST]) should be provided to all children and adolescents with complex ADHD. These treatment approaches in home, school, and peer settings address key functional domains (behavioral, educational, social) that are associated with long-term outcomes.**

## Evidence Profile

- *Aggregate evidence quality:* Grade B
- *Benefits:* Evidence indicates that appropriate behavioral treatments targeted at impairments across settings and linked to assessment findings generally will result in improvements in key domains of functioning for children with complex ADHD.<sup>24,65,66</sup> The high rate of coexisting disorders and severity of functional impairments associated with ADHD make it imperative to ensure access to appropriately comprehensive behavioral intervention. Appropriate behavioral treatment of ADHD, coexisting disorders, and functional problems may help to decrease the risks for serious adverse long-term outcomes.<sup>24,65-69</sup>
- *Harms/risks/costs:* Clinicians should generally recommend implementing the most cost-effective approaches before considering higher "dose" and more costly options (e.g., group BPT before individual BPT, class-wide BCM vs individual options, and a daily report card [DRC] vs an individualized point system) and should carefully consider the child's developmental level.
- *Benefits-harms assessment:* The cost in family and clinician time and resources for appropriately comprehensive behavioral treatment should be considered relative to the costs of medical treatment and in

the context of the much more significant costs associated with failure to provide treatment.<sup>70,71</sup> The benefits of appropriately comprehensive behavioral treatments of children and adolescents with complex ADHD outweigh any potential harm. Receipt of ineffective treatment or lack of treatment may increase the risk of lifelong adverse outcomes.

- *Value judgments:* Developmentally appropriate psychosocial treatment is the foundation of comprehensive treatment of children and adolescents with complex ADHD. Interventions should be based on evidence-based practices and provided with a reasonably high level of fidelity.
- *Role of patient preferences:* Using an SDM model, the family should be actively involved in the process of determining target behaviors for intervention, selecting the components of behavioral interventions, and collaborating with teachers to develop the BCM.<sup>42,43,45,72-76</sup> When school interventions are being implemented, teachers should be actively involved, and interventions need to fit the teacher's instructional styles and overall classroom management strategies. In addition, when intervening with older children and adolescents, youth goals and preferences need to be understood and addressed.
- *Exclusions:* None.
- *Intentional vagueness:* None.
- *Strength:* Strong recommendation

Treatment should always begin with age-appropriate psychoeducation about ADHD, provided to both the affected child or adolescent and his or her family. Psychoeducational approaches may include written materials, websites, parent groups, and information provided directly by the clinician to the patient and family. Psychoeducation should be provided in a manner that promotes family empowerment by involving the family actively in the educational process. Family and cultural factors and the local availability of resources must be considered to ensure that every patient and family receives appropriate information in the most effective format to meet their individual needs. Psychoeducation should continue over time with updated information that is consistent with the patient's age, developmental stage, educational setting, and coexisting conditions. For younger patients, psychoeducation is primarily directed toward parents or caregivers. As patients move into and through adolescence, psychoeducational efforts should increasingly be directed toward the patient.

Behavioral parent training involves teaching parents the application of behavior modification procedures to address targeted behaviors in the home setting, including a strong emphasis on using positive reinforcement for adaptive, responsible child behaviors (e.g., compliance with parent requests, appropriate behavior with siblings, completing household chores and routines), and systematic, appropriate consequences for maladaptive behaviors (e.g., systematic ignoring of

high-frequency, nonadaptive behaviors such as whining, punishment or response cost for noncompliance with parent requests, or aggressive behavior). Over the past 35 years, a very large number of well-designed studies have examined the effectiveness of BPT for children with ADHD and other disruptive behavior. The evidence demonstrates that BPT is a well-established treatment for reducing the problems and increasing desired adaptive skills shown by children with ADHD in home settings. Median effect sizes for this intervention when compared with a waitlist control or routine care condition generally are in the medium range.<sup>42,43,45,72,73</sup>

Behavioral classroom management involves teacher-implemented BCM strategies in the child's classroom setting. These include routine strategies implemented at the class-wide level (e.g., posted classroom rules, positive reinforcement for appropriate behavior and work completion/accuracy, appropriate consequences for rule violations). Class-wide interventions are labeled as Tier 1 interventions in the standard Response-to-Intervention approach used in schools. Additional interventions involve individualized programs focused on the child's specific problems in the classroom, such as a DRC implemented by the teacher that (1) establishes daily goals for the child and a means for evaluation and (2) provides daily feedback to the child and his/her parents/caregivers. Such individualized Tier 2 interventions are used when Tier 1 interventions have been insufficient. Class-wide BCM and programs such as DRCs targeted for individual children are commonly implemented in school settings in the United States. Furthermore, a high proportion of school districts have established guidelines for implementing behavioral interventions in classroom settings. Clinicians should collaborate with school personnel to help to ensure that their patient receives appropriate school-based interventions. BCM is a well-established intervention for ADHD in school settings with large effect sizes in a very large number of studies conducted in schools.<sup>42,43,45,72,76</sup>

Children with ADHD are entitled to BCM and other educational strategies. Consistent with recent guidelines about the implementation of Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act,<sup>77</sup> children with ADHD fulfill criteria for having a disability and therefore are entitled to protections under Section 504, including the development and implementation of a service plan. The guidelines assert that these plans need to include academic and behavioral interventions, not just accommodations for ADHD. It is important to emphasize that these "interventions" refer to a systematic, well-designed set of strategies (e.g., BCM) shown to be effective through research with children who have ADHD and related problems. By contrast, an "accommodation" is an environmental adjustment designed to "level the playing field" for children with disabilities. Examples of accommodations that have been proposed for children with ADHD include seating in the classroom near the teacher or having extended time to take tests. Although accommodations may be helpful as part of a

comprehensive service plan, their use is generally not sufficient, and there is little evidence to support the effectiveness of accommodations when used on their own.<sup>78</sup>

Many children with ADHD meet criteria for special educational services, entitling them to an IEP plan according to the Individuals with Disabilities Education Act.<sup>55</sup> These children may be eligible for special education by virtue of coexisting LDs or severe emotional or behavioral problems. In addition, many students with ADHD have impairments that significantly interfere with school performance and therefore qualify for services under the Other Health Impaired category.<sup>79</sup> IEPs for students with ADHD also need to include evidence-based interventions such as BCM, when indicated. Students with ADHD who do not qualify for special education are still protected under the provisions of Section 504.<sup>77</sup> It is also important to note that the beneficial response to medication, such as improvement in a child's behavior or other functioning, may *not* be used by a school district to deny implementation of a 504 plan or an IEP.

Behavioral peer interventions involve the application of behavioral procedures to address problems that children with ADHD exhibit with peers in school, home, and neighborhood environments. These problems include skills deficits (lack of knowledge about appropriate social interactions) and inappropriate social behaviors (e.g., verbal and physical aggression toward other children). Skills deficits are typically approached through weekly group training sessions in school or clinic settings in which children are taught important concepts for successful peer interactions (e.g., how to initiate interactions with other children). Behavioral excesses (e.g., name-calling, teasing, aggression) are typically dealt with in the settings in which they occur by behavior management plans implemented by teachers, school psychologists, child care workers, coaches, youth club leaders, and other adults who interact with these children in peer settings. Many studies have shown that behavioral interventions focused on inappropriate peer-directed behaviors implemented in school<sup>80</sup> or summer camp settings have substantial effects with medium to large effect sizes, depending on the study designs.<sup>80-82</sup> By contrast, there is limited evidence for the effectiveness of office- or clinic-based social-skills training alone for these children. These approaches typically fail to provide children with sufficient support at the "point of performance" (i.e., school, home, and community). When providing BPI, it is important to incorporate strategies to promote the generalization of skills across settings. When administered at the point of performance (i.e., the setting in which the problematic peer-related behaviors are occurring), BPI is a well-established intervention for ADHD in children.<sup>42,43,45,72,76,81</sup>

Organizational skills training involves training students to organize learning materials, track assignments, and plan work completion. The training typically includes consultation with parents and/or teachers to promote

generalization in real-world settings. The strength of the evidence for this intervention is less than that for the other forms of behavioral intervention. Nonetheless, there is growing evidence that OST is effective for older elementary-aged children and adolescents with ADHD. Median effect sizes, when compared with control groups, are generally in the medium range.<sup>83-86</sup>

Given that all children with ADHD qualify for 504 plans and many for IEPs, it is essential to include BCM, BPI, and OST in IEPs and Section 504 plans.

Additional nonpharmacological ADHD interventions have been developed such as cognitive training (e.g., working memory training) and neurofeedback. Although these approaches have shown some improvement in laboratory-based, task-specific outcomes, none have demonstrated sufficient evidence of effectiveness in real-world domains of functioning (e.g., behavior at home and school, academic performance, peer relationships) to recommend them for use in practice with children and adolescents with ADHD.<sup>87-89</sup> In addition, many approaches to treating children with ADHD, such as play therapy, sensory integration, hippotherapy, and eye tracking, have little to no evidence to support their use and are not recommended.

A major challenge in providing care to adolescents and under-resourced or highly stressed families is engaging them actively in intervention. Motivational interviewing strategies appear to have promise in promoting intervention engagement so that youth and families can benefit from evidence-based treatments. There are considerably fewer studies and therefore less evidence of effectiveness with families of adolescents than of school-age children who have ADHD.<sup>72,90-92</sup>

### **Special Circumstances: Variation of Psychosocial Interventions Based on Age and Developmental Level**

The appropriateness and effectiveness of evidence-based behavioral interventions for children with ADHD vary as a function of the developmental level of the child. In general, as children mature into adolescence, it is important to involve them more centrally in the development and implementation of behavioral interventions. For adolescents, strategies to promote youth engagement and motivation (e.g., motivational interviewing) may be helpful. For BPT, BCM, and BPI, evidence of effectiveness is much stronger for children younger than 12 years. OST may be effective for older children and adolescents (aged 9–18 years) but less appropriate and effective with younger children.

### **Comments for Implementation**

In general, intervention effectiveness is related to multiple factors, including (1) how well interventions are implemented by clinicians, parents, and teachers (fidelity); (2) the cultural effectiveness of the clinician; (3) the extent of parent engagement, which is influenced by the therapeutic relationship between the clinician and the family; (4) the extent of engagement and motivation

of adolescents who are being treated; and (5) the level of teacher investment in intervention.

The treating clinician should be in contact with school personnel to integrate the interventions being overseen by the clinician (e.g., assessment, pharmacological treatment) with those being implemented in school. For example, regular teacher ratings are helpful, if not essential, in titrating medication dosage (see KAS 4 below).<sup>93</sup> It is also essential for the clinician to communicate with the child or adolescent's primary care clinician to ensure coordination of care.

**Action statement 4: Treatment of complex ADHD should include evidence-based approaches that address ADHD and account for coexisting conditions while respecting family background and preferences. Although behavioral and educational approaches serve as the foundation for intervention, it is often necessary to combine these approaches with pharmacological treatments. Treatment should focus on areas of functional impairment, and not just symptom reduction, by incorporating developmentally appropriate strategies for self-management, skill building, and prevention of adverse outcomes (e.g., substance use, conduct problems, problems of depression/anxiety, suicidal ideation, educational failure).**

### **Evidence Profile**

- *Aggregate evidence quality:* Grade C to B (may vary by specific coexisting condition)
- *Benefits:* The implementation of evidence-based interventions for ADHD and its coexisting conditions can be effective in reducing impairments associated with ADHD in multiple settings. The ongoing implementation of evidence-based interventions may prevent or reduce the severity of adverse long-term outcomes associated with ADHD.
- *Harms/risks/costs:* Treatments for ADHD are associated with risks, including the time and effort to implement treatments, the financial cost of treatment, safety risks and side effects associated with medication (particularly polypharmacy), and potential stigmatization associated with application of diagnostic labels and/or receipt of mental health treatment in school and community settings.
- *Benefits-harms assessment:* More investigation examining long-term effects of medication treatment and behavioral treatment is needed. Acknowledging that behavioral/educational approaches are foundational for the treatment of ADHD, the preponderance of existing evidence regarding short-term treatment and expert consensus indicate that combined interventions are often indicated when addressing ADHD and its coexisting conditions. Overall, the benefits of using evidence-based psychosocial, pharmacological, and combined interventions for ADHD outweigh the harms, although an assessment of benefits and harms

should be highly individualized and conducted in collaboration with the patient and family, consistent with a SDM approach to care.

- *Value judgments*: The Panel took into consideration the existing literature regarding the treatment of ADHD when it occurs with coexisting conditions. Although the quality of evidence may vary by specific pharmacological agent and by specific coexisting condition, the overall limited availability of the literature led the Panel to take a conservative approach and grade the overall quality of evidence across coexisting conditions.
- *Role of patient preferences*: Treatment planning should be guided by family treatment preferences and feasibility of obtaining treatments, incorporating family assessment of which symptoms and impairments are most problematic, and family goals for treatment (e.g., academic performance and classroom behavior, peer relationships and interactions, compliance with adult requests and commands, improved parenting skills and family functioning, reduction of family stress)<sup>94,95</sup> when prioritizing and sequencing treatment modalities. It is especially important to include the affected youth in this process as they approach adolescence.
- *Exclusions*: Serious mental health conditions, such as schizophrenia/psychosis, severe depression with suicidal ideation, homicidal ideation, and bipolar disorder, are not addressed because these conditions are considered beyond the scope of this guideline. Additional coexisting conditions (e.g., seizures/epilepsy, sleep disorders.) are not specifically addressed because of space considerations.
- *Intentional vagueness*: None.
- *Strength*: Recommendation

Treatment planning should carefully consider the developmental level of the child. Response to psychosocial treatments may vary by age (See KAS 3).<sup>45,83</sup> Medication may be somewhat less effective in preschool-age children compared with older children, and adverse side effects may be more common among preschool-age children and those with developmental disabilities.<sup>52,53,96</sup> Poor adherence in adolescence often mitigates the effectiveness of any treatment modality (medication or behavioral) in this age group.

In the following section, we address the treatment of ADHD with specific coexisting conditions. This section provides an overview of information about the effects of psychosocial, pharmacological, and multimodal treatment to the extent that existing research allows. It is important to emphasize again that psychosocial treatments are foundational for treatment of ADHD with coexisting conditions and that treatment depends on recognition of the major source of functional impairment (i.e., impact of core ADHD symptoms vs impact of the coexisting condition or conditions). Treatment should target the area of greatest functional impairment. For some children, the clinician may determine

that the child is experiencing equally significant functional impairment due to core ADHD symptoms and due to a coexisting condition. In these situations, it is appropriate to initiate evidence-based treatment for ADHD and monitor progress carefully. Ongoing treatment decisions should be informed by monitoring of function, with adjustment of treatment targets based on changes in domains in which the child or adolescent is impaired or severity of functional impairments. The treatment algorithms that accompany this guideline provide additional information to guide clinicians in using this treatment strategy.

### **Special Circumstances: Attention-Deficit/Hyperactivity Disorder and Coexisting Conditions**

#### **Attention-Deficit/Hyperactivity Disorder and Coexisting Learning Disorder**

Expert consensus<sup>54</sup> and the available literature<sup>97</sup> recommend multimodal treatment with comprehensive, empirically supported interventions (including behavioral and academic interventions, often in combination with pharmacological treatments) to address *both* ADHD and LD. To date, studies on the impact of medication (stimulants and nonstimulants) on reading skills among children with coexisting ADHD and reading LD have not demonstrated that pharmacological treatment improves academic outcomes.<sup>97-105</sup> By contrast, academic interventions for reading LD have strong empiric support.<sup>106</sup> Data are lacking regarding the effects of ADHD medication on math and writing skills in children with ADHD and math or writing LD, whereas research supports academic interventions to improve math<sup>107-109</sup> and written expression<sup>106,110</sup> for children with LDs in these domains. To reduce ADHD symptoms in the presence of coexisting LD, evidence suggests that stimulants<sup>97,111,112</sup> and atomoxetine<sup>98-101</sup> are effective (with the strength of evidence generally greater for stimulants than for atomoxetine),<sup>113</sup> although most studies involve children with coexisting reading LD with little evidence regarding coexisting math LD<sup>111</sup> or writing LD. There are limited data regarding the effects of clonidine or guanfacine on ADHD symptoms in children with coexisting ADHD and LD.

#### **Attention-Deficit/Hyperactivity Disorder and Coexisting Autism Spectrum Disorder**

The limited available literature and expert consensus recommend comprehensive, multimodal, multisetting treatment to address social, language, academic, and daily living skills for children with coexisting ADHD and ASD. More extensive data are available regarding the effectiveness of interventions for ASD (without specific reference to ADHD status), with summaries of this evidence developed by the National Autism Center National Standards Project.<sup>114</sup>

No medications have been shown to improve *core ASD deficits* in communication and social functioning. It is important to recognize that, for some children, associated *ADHD symptoms* may cause functional impairment. There are some data suggesting benefit from medications

to address *ADHD symptoms* in children with ASD when evidence-based behavioral interventions such as applied behavior analysis are not sufficient. Methylphenidate (MPH) has been shown to be effective in improving *ADHD symptoms* in children with ASD, although compared with typically developing children with ADHD, response rates are lower and discontinuation rates higher because of increased adverse events.<sup>52,53,115-117</sup> There are limited data regarding effects of amphetamine derivatives in ADHD and ASD. Randomized controlled trial data are available showing the benefits of atomoxetine, guanfacine, and clonidine,<sup>118-121</sup> although data regarding non-stimulants are much sparser than data on MPH. Hence, for the treatment of impairing ADHD symptoms among children with ASD, expert consensus recommends a trial of a stimulant first, followed by an  $\alpha$ 2-adrenergic receptor agonist or atomoxetine.<sup>122</sup>

### **Attention-Deficit/Hyperactivity Disorder and Coexisting Intellectual Disability**

In addition to ADHD treatments, multimodal school- and community-based interventions to address academic and adaptive skills are recommended for children with ADHD and ID,<sup>123</sup> including special education services and behavioral interventions that are functionally related to the cause of behavior problems.<sup>124</sup> In addition, available studies suggest efficacy for training programs that teach parents/caregivers to implement strategies such as positive reinforcement, planned ignoring, giving instructions and setting rules, verbal correction, and time out.<sup>125-128</sup>

For children with ID and ADHD symptoms that are a source of significant functional impairment, medications have also been used to address ADHD symptoms. A limited number of stimulant clinical trials have focused exclusively on children with coexisting ADHD and ID<sup>129-143</sup>; 37% to 75% of the children with ADHD and ID could be considered stimulant responders, with most studies using MPH.<sup>144-148</sup> A few studies have found that intelligence quotient >50 and higher baseline ratings of inattention and hyperactivity are linked to positive response.<sup>130,149,150</sup> In the few studies examining stimulant side effects in children with ADHD and ID, most,<sup>135,151,152</sup> but not all,<sup>142</sup> found an increased risk of some side effects (e.g., social withdrawal<sup>135,151,152</sup>). In the absence of coexisting medical conditions or contraindications, stimulants are recommended to treat children with ADHD and ID,<sup>153</sup> whereas there is scant evidence for guanfacine,<sup>118</sup> clonidine,<sup>154</sup> or atomoxetine in this population.<sup>155</sup>

### **Attention-Deficit/Hyperactivity Disorder and Coexisting Tics**

Among children with ADHD, the prevalence rate of chronic tic disorders is ~20%,<sup>156</sup> although mild tics are frequently overlooked. Among children treated with stimulant medication, tics may be more likely to be noticed because of concerns that stimulant medications may cause or exacerbate tics,<sup>157</sup> although this concern is not supported by the available evidence.<sup>158</sup> If the tics are more impairing than the ADHD symptoms, behavioral or

medication treatment options may be considered. Comprehensive behavioral intervention for tics (CBIT) may be as effective and has fewer side effects than other treatments such as neuroleptics.<sup>159</sup> Among medication options, the balance of clinical benefits to harm favors  $\alpha$ 2-adrenergic receptor agonists (clonidine and guanfacine) as first-line agents.<sup>160,161</sup>

If ADHD symptoms are more impairing than the tics, ADHD psychosocial and medication interventions should be considered. Stimulants may be selected as first line among medications even in the setting of coexisting tics.<sup>158</sup> If tics emerge or increase and are experienced as unacceptable, options include trial discontinuation of stimulant with later rechallenge, addition of an intervention to address tics (CBIT or a tic-reducing medication), or a change to a nonstimulant ADHD medication.<sup>157,162</sup>

### **Attention-Deficit/Hyperactivity Disorder and Coexisting Substance Use Disorder**

Children and adolescents with ADHD are at higher risk than unaffected peers for developing SUD.<sup>8,163</sup> This risk for new-onset SUD emerges at an earlier age than for typically developing peers<sup>28,65,164</sup> and persists into adulthood.<sup>27,165</sup> Many factors may contribute to this vulnerability, including neurophysiological mechanisms and behavioral symptoms of ADHD,<sup>166</sup> as well as coexisting conditions such as mood and disruptive behavior disorders (DBDs).<sup>167,168</sup> Prevention and treatment strategies for SUD in youth with ADHD are critical and should focus on recognizing and anticipating these heightened vulnerabilities. Early childhood ADHD diagnosis and treatment with psychostimulant medication does not appear to increase SUD risk, with some studies demonstrating an association between stimulant treatment and reduced risk for SUD.<sup>8,169</sup>

Clinicians should screen all patients aged from 9 to 11 years with ADHD for SUD with the 2-question National Institute on Alcohol Abuse and Alcoholism Youth Alcohol Screening Tool because this screening tool is indicated for children as young as 9 years.<sup>170</sup> Beginning at age 12 years, clinicians should use the Screening to Brief Intervention approach, consistent with recommendations from the recent AAP clinical report on substance use screening.<sup>171-173</sup> Identification of suspected or confirmed SUD requires immediate brief intervention and referral to an addiction or mental health specialist. Treatment should address addiction first and then ADHD.<sup>166,174</sup> When prescribing medications, clinicians are advised to choose a stimulant with lower liability for abuse, such as an extended-release or transdermal formulation,<sup>166,174</sup> with some evidence suggesting that MPH may have less abuse potential than amphetamines. It is also reasonable to consider a nonstimulant such as atomoxetine to address ADHD in the setting of treated SUD.<sup>166,174</sup> ADHD medications may have less or no effectiveness in those with SUD.<sup>175,176</sup>

The toxicity risk when combining prescription psychostimulants with substances of abuse is unclear.<sup>177</sup>

Psychostimulant diversion, misuse, and abuse are increasing, particularly among male adolescents with ADHD and SUD who also have coexisting conduct disorders or poor academic performance.<sup>166,178,179</sup> Additional misuse risk factors include treatment with immediate-release stimulant formulations, which should only be prescribed to college students with caution. Prevention of diversion, misuse, and abuse should stem from developmentally appropriate anticipatory guidance and close monitoring,<sup>166</sup> including educational materials, monitoring pill counts and storage, and developing a plan for the patient if approached by peers seeking diversion.<sup>178,180</sup>

### **Attention-Deficit/Hyperactivity Disorder and Coexisting Internalizing Disorders (Anxiety or Depression)**

In the context of ADHD and coexisting internalizing disorders, clinicians and families should first assess which disorder is more impairing and whether symptoms warranting immediate referral or crisis management are present. If the coexisting internalizing disorder is more problematic, then evidence-based psychosocial treatments generally are recommended (e.g., cognitive-behavior therapy [CBT] with exposure sessions for anxiety,<sup>181</sup> CBT, or interpersonal therapy for depression<sup>182,183</sup>). If psychosocial intervention has been delivered and symptoms and impairments related to internalizing disorders continue to be a major concern, clinicians should collaborate with families to determine whether to modify the psychosocial intervention or to combine this intervention with medication (e.g., selective serotonin reuptake inhibitors).<sup>184,185</sup> If psychosocial treatment is not sufficient, especially for children and adolescents with more severe symptoms of depression or anxiety, a combined psychosocial and pharmacological approach is often recommended.

If the ADHD symptoms are more impairing, it should be noted that evidence-based behavioral interventions for ADHD are often effective in reducing symptoms of both ADHD and internalizing problems.<sup>184,185</sup> These children may respond more favorably to behavioral interventions than other children with ADHD.<sup>186</sup> If behavior therapy for ADHD is provided and impairments are still a concern, clinicians are encouraged to collaborate with families to modify or intensify behavioral approaches. Some children with coexisting ADHD and internalizing problems need treatment that includes medication.<sup>187</sup> Stimulant medication and atomoxetine<sup>188</sup> have been shown to be effective for treatment of ADHD with and without coexisting internalizing disorders, but stimulants are generally more effective.<sup>186,189</sup> Stimulant medication typically does not exacerbate internalizing symptoms and may be associated with a reduction in these symptoms.<sup>190,191</sup> Thus, when using medication to treat ADHD with coexisting anxiety and/or depression, stimulants are usually considered the first line of pharmacological treatment. Evidence from the Multimodal Treatment for Attention-Deficit/Hyperactivity Disorder

ADHD treatment trial suggests that combined behavioral and stimulant medication treatment may confer more beneficial effects on internalizing symptoms than behavioral treatment.<sup>192</sup>

### **Attention-Deficit/Hyperactivity Disorder and Coexisting Disruptive Behavior Disorders**

Among children with ADHD and coexisting DBD (i.e., oppositional defiant disorder and conduct disorder, including aggressive and bullying behavior), evidence-based behavioral interventions for ADHD are generally effective in reducing the symptoms and impairments of both ADHD and DBD.<sup>192</sup> BPT is a standard psychosocial treatment for children with ADHD and DBD. Children and adolescents with serious conduct problems may require intensive multisystemic interventions,<sup>193</sup> including services in home, school, and community settings. If behavior therapy has been provided and concerns about the symptoms and impairments of DBD persist, it is recommended that clinicians and families collaborate to determine whether to modify and intensify the behavioral interventions (e.g., provide individualized care) or combine behavioral interventions with medication. Some children and adolescents with ADHD and DBD require an approach combining behavioral and pharmacological interventions, with some evidence suggesting that combined behavioral and pharmacological treatment may provide more beneficial effects on oppositional/aggressive symptoms than behavioral treatment alone.<sup>187,192</sup> In general, when using medication to treat ADHD and DBD, stimulant medication is considered the first-line treatment.<sup>194</sup> The decision to use pharmacological treatment should be informed by an SDM approach. Earlier pharmacological treatment may be indicated if previous evidence-based behavioral interventions have had limited effects.

### **Attention-Deficit/Hyperactivity Disorder and Sociodemographic Disadvantage**

Attention-deficit/hyperactivity disorder is diagnosed less often, and medication treatment is used at a lower rate, for children from racial and ethnic minority backgrounds, adolescents, and those experiencing poverty.<sup>56,195-201</sup> ADHD medication has been found to be effective in reducing symptoms and improving executive functioning in children of minority status<sup>202,203</sup>; however, when compared with the general population, parents of children of minority status may have less ADHD awareness<sup>204</sup> and may be less likely to take health-seeking measures,<sup>205</sup> view medication treatment as less acceptable,<sup>206</sup> and expect less benefit from treatment.<sup>207</sup> It is important for the treating clinician to be aware that parents from different racial and ethnic backgrounds may have differing experiences, perceptions, and attitudes about ADHD and its treatment. Dropout from psychosocial treatments for ADHD is associated with child ethnicity and low socioeconomic status.<sup>208</sup> Research suggests that combined behavioral and medication approaches to treatment may be particularly important and advantageous

for families of low-income status and those of ethnic minority background, especially when the focus is on reducing aggressive and disruptive behavior.<sup>209,210</sup> Culturally appropriate treatment of ADHD in these children and adolescents should be informed by an understanding of their unique challenges. Motivational interviewing strategies, assistance in reducing barriers to care, opportunities for social support and problem solving among peers, and increased coaching during behavior therapy may be helpful in improving family engagement and therefore treatment outcomes.<sup>74</sup>

## Comments for Implementation

The preponderance of evidence supports the use of a parsimonious approach to treating ADHD with coexisting conditions. The clinician and family, using SDM, should determine which condition (ADHD or the coexisting condition) is most impairing and apply treatment to that primary condition first. If treatment for the condition of primary concern is not sufficient to address the impairing symptoms of the other condition, then treatment of impairments attributable to the other disorder should be initiated. When using behavioral interventions, treatment selection should be based on the primary focus of treatment and, as discussed previously, impairments, rather than DSM symptoms, should be the focus of behavioral treatments. When using pharmacological treatments, clinicians should use a monotherapeutic approach before considering multiple medications, given the limited evidence for efficacy and safety of polypharmacy. During the course of intervention, it is common for the focus of treatment to shift. For example, in a child with ADHD and a coexisting anxiety disorder, the primary focus of treatment may shift from ADHD to anxiety if the treatment for ADHD has sufficiently reduced ADHD-related impairment such that anxiety has become the more prominent source of impairment. In these cases, evidence-based interventions for the coexisting condition (e.g., cognitive behavioral therapy for anxiety) are integrated into the care of the child and are applied until treatment goals related to the coexisting condition are met or the primary focus of treatment shifts to another disorder (e.g., back to ADHD-related impairment).

A recent study suggests that families may become more engaged in behavioral treatment and hence reap the benefits of combined treatment if behavior therapy is used at the outset (i.e., before medication is initiated).<sup>71,211,212</sup> Therefore, a sequential approach to treatment starting with behavioral therapy should be considered. Factors to be considered in determining initial treatment include severity of the disorder and impairments, family treatment preferences, and access to behavioral and pharmacological care. Among children for whom unimodal treatment is not sufficient, combining treatments to reduce symptoms and impairments is indicated. When combining treatments, using lower doses of pharmacological and behavioral interventions may achieve the

same outcomes as using a higher dose of either intervention separately.<sup>71,211,212</sup> Advantages of a combined approach at lower doses are that it may be easier to sustain treatment over time, and side effects of medication are less frequent and severe.

Clinicians have a primary responsibility to educate families about the importance of behavioral and school interventions, including advocacy for children in the educational system and connection to community resources such as the CHADD National Resource Center for ADHD.<sup>213</sup> Clinicians also have the responsibility to guide families to evidence-based behavioral treatments. For communities that do not offer these services, evidence-based distance learning behavioral treatment programs are increasingly available, including those offered by CHADD.<sup>214</sup>

Parent and family factors can affect the implementation of psychosocial and pharmacological interventions for children and adolescents with ADHD and may contribute to outcomes. For example, parents of children with ADHD have an increased risk of ADHD, depression, conflict between caregivers, and caregiver stress. These family factors may affect parental implementation of treatments, including adherence to medication regimens and consistent and sustained implementation of behavioral parenting strategies.<sup>73-75</sup> Therefore, clinicians should educate caregivers on the need to address their own social-emotional issues.

**Action statement 5: Given that ADHD is a chronic condition that often persists into adulthood, treatment of complex ADHD should include ongoing, scheduled monitoring of patients throughout the lifespan, commensurate with individual patient's needs and profile with particular emphasis on preparing for key developmental transitions (pre-school to school, elementary to middle school, middle to high school, and high school to post-secondary education or employment).**

## Evidence Profile

- *Aggregate evidence quality:* Grade B
- *Benefits:* Coexisting disorders place children with ADHD at greater risk for adverse long-term outcomes and may require more intensive monitoring and adjustment of treatment strategies, including combined psychosocial and complex pharmacological treatments. Adjusting psychoeducation and treatment to meet the needs of different developmental stages (especially adolescence and transition to adult care) may improve social, academic, and family functioning.<sup>215</sup>
- *Harms/risks/costs:* Practices must create and implement new processes to incorporate additional screening and tools or systems for monitoring, which requires resources and incurs costs related to time and personnel. Ongoing screening and monitoring may identify concerns requiring immediate attention, additional

support resources, and/or transfer of care (e.g., to child and adolescent psychiatry).

- *Benefits-harms assessment:* Adolescents with ADHD, who may lack insight to their symptoms and areas of functional impairment, frequently question the benefits of ADHD treatment, have concerns about side effects of medication, and frequently struggle with adherence to treatment. Adolescents with ADHD can be expected to have the same difficulty with adherence as is noted among adolescents with other chronic disorders (e.g., diabetes). Preparing adolescents to manage their own ADHD care and to transition successfully to adult care systems may prevent treatment attrition. Systematic monitoring of functional impairment and symptoms may incur greater cost and resources but are outweighed by the benefits associated with identifying emerging problems and coexisting conditions in a timely manner and addressing them promptly.
- *Value judgments:* The guideline emphasizes an approach to monitoring child and family functioning that considers not only ADHD symptoms but also the broad range of relevant domains including physical and mental health, as well as academic, social, and community functioning and long-term outcomes.
- *Role of patient preferences:* There should be a balance between family and clinician monitoring needs and preferences, given the patient's physical and mental health status, the patient's age and developmental status, the clinician's responsible prescribing considerations, and the patient/family preferences for, comfort with, and feasibility of monitoring modality (e.g., face-to-face, electronic, telephone).
- *Exclusions:* None.
- *Intentional vagueness:* We have not specified the precise frequency or modality of monitoring, nor the exact timing for transitioning SDM from parent to adolescent/transitional youth.
- *Strength:* Strong recommendation

Monitoring should include standardized information (e.g., rating scales) obtained at least 2 to 4 times/year, especially during the school year, from caregivers, school personnel, and from the patient when appropriate (i.e., adolescent patients). In-person monitoring may be supplemented with remote monitoring (e.g., through rating scales obtained electronically between visits).<sup>60-62</sup> Monitoring may be accomplished by a range of clinicians on the care team, including primary care clinicians, nurses, and other support staff. The following domains should be monitored at each in-person visit for all patients, including those not currently prescribed ADHD medications:

- ADHD-related symptoms and functioning: ADHD symptoms; functional impairment in home, social, and school settings

- Symptoms, impairment, and functioning related to coexisting conditions
- Physical parameters: weight and height
- Psychosocial stressors, including peer victimization, family mental health, and other social determinants of health that may exacerbate effects of ADHD
- Identification and promotion of strengths

For patients who are prescribed ADHD medication, monitoring should also include attention to side effects and cardiovascular indices (i.e., heart rate, blood pressure). Such patients will require more frequent monitoring depending on the stage of medication treatment (e.g., titration, medication change). After initiation, the available evidence suggests that there is an improvement in outcomes if there is a monitoring contact made through an in-person, telephone, or electronic communication within 30 days.<sup>216</sup> Screening and assessment for emerging coexisting conditions (including mental health, neurodevelopmental, learning, and physical health conditions) should be conducted at least annually and whenever concerns noted by caregiver or teacher arise. Such screening should use developmentally appropriate and cost-effective tools and procedures. Behavioral interventions and psychoeducation should be reconsidered whenever patients enter a new developmental stage. Treatment should be adjusted as appropriate for the developmental stage and change in clinical profile.

## Comments for Implementation

Structured preparation for key developmental transitions, especially adolescence and transition to adult care systems, needs to be developed. The implementation of effective support for transition to adulthood often requires non-face-to-face clinician time, which is often not reimbursed and therefore may be a challenge in the context of current healthcare systems. Transition to adult care systems requires clinicians who deal primarily with adults and are equipped to receive and manage these patients.

## ADVOCACY

To ensure that children and adolescents with complex attention-deficit/hyperactivity disorder (ADHD) have access to recommended assessment and treatment services, a number of issues must be addressed:

- Adequate insurance coverage and reimbursement for diagnostic and treatment services, including the following:
  - Psychological, psychoeducational, and neuropsychological testing when indicated
  - Evidence-based psychosocial interventions in health care, school, and community settings
  - Care coordination among clinicians, parents, teachers, and patients
- Training of primary care clinicians to improve understanding of the coexisting conditions that often



accompany ADHD and contribute to risk for serious adverse outcomes and training to improve understanding of both psychosocial and pharmacological treatment approaches

- Expanded workforce of clinicians with special expertise in the management of complex ADHD
- Expanded workforce of mental health providers to offer evidence-based psychosocial treatment for ADHD in school and community settings
- Adequate funding to support school-based services and intervention
- Recognition that typical school-based assessments may not be sufficient for children and adolescents with complex ADHD (i.e., comprehensive assessment by other healthcare professionals may be required)
- Understanding that the availability of school-based assessments and services should not be the basis for refusal to provide insurance coverage for recommended assessment and treatment services in the healthcare system

## AREAS FOR FUTURE RESEARCH

The Panel identified gaps in research related to the assessment and treatment of children and adolescents with complex attention-deficit/hyperactivity disorder (ADHD):

- Diagnostic and treatment approaches for children younger than 4 years and for adolescents
- Diagnostic and treatment approaches for coexisting conditions and special circumstances (e.g., children living in poverty, experiencing adverse events, or from different cultures)
- Psychosocial interventions, including interventions for adolescents, generalizing treatment effects across settings, matching treatment intensity to severity of functional impairment, and sequencing and combining psychosocial and pharmacological treatment
- Prevention and treatment of substance use disorders
- Multimodal treatment approaches tailored for ADHD and specific coexisting neurodevelopmental and mental health conditions
- Optimal timing of visits, screening for emerging coexisting conditions, and process for transition to adult care
- Delineating the functional impairments experienced by persons with ADHD from childhood through adulthood

## CONCLUSION

Attention-deficit/hyperactivity disorder (ADHD) is often associated with coexisting conditions and other factors that complicate the diagnostic and treatment process, placing affected children and adolescents at increased risk for serious adverse outcomes in adulthood. This guideline provides recommendations for key aspects

of the assessment and treatment of children and adolescents with complex ADHD and highlights areas for advocacy and research to address problems with access to recommended services and gaps in the evidence base. A companion set of implementation algorithms has also been developed to facilitate assessment and treatment.

## ACKNOWLEDGMENTS

*The Panel would like to express its most sincere appreciation, admiration, and gratitude to Ms. Polly Vernimen, Executive Assistant, Division of Developmental Medicine, Boston Children's Hospital. Ms. Vernimen organized all Panel meetings, communications, and documents, and assisted with preparation of the published articles. It would not have been possible to complete the guideline without Ms. Vernimen's outstanding efforts, judgment, and grace throughout the entire period of the Panel's work. The Panel also thanks Jason Fogler, PhD and the Boston Children's Hospital Group on ADHD Treatment for graciously sharing their process of care algorithms, which served as important source material for the algorithms in the guideline. The authors also thank Ms. Sarah Weas, Division of Developmental Medicine, Boston Children's Hospital for her effort in preparing the algorithms. Finally, the Panel thanks Mr. Brian Epstein for his expertise and efforts in developing the electronic platform for the guideline evidence review and for preparing the evidence tables.*

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