Colorado Journal of Psychiatry & Psychology

Child and Adolescent Mental Health

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Reading maketh a full man, conference a ready man, and writing an exact man.—Francis Bacon

The first issue of the Colorado Journal of Psychiatry and Psychology is in many ways the application of Bacon's principles for personal growth and erudition as applied to a great, 21st-century department of psychiatry.

First, we study. We study to be better clinicians, to be better scientists, and to be better educators. And as we aspire, as all in academic healthcare do, to produce meaningful new scholarship, it is through an intimate awareness of the work that has come before that we find the places where new contributions are needed.

Second, we talk. Academic medicine is a team sport–we never really work alone–and the richness of our collaborations often define the success of our clinical, teaching, research, and scholarly endeavors.

Third, we write. We write to record our work, to clarify our ideas, and to share them with our colleagues. It is through the crucible of well-informed, collaborative, and peer-reviewed writing that we make ourselves the best professors we can possibly be.

The Colorado Journal of Psychiatry and Psychology is a new avenue to support pursuit of excellence. The Journal is for all of us—our department, the Rocky Mountain Region, our colleagues nationally, and especially, our patients and their families.

– *Douglas Novins*

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Call for Papers on Children's Mental Health

The Colorado Journal of Psychiatry and Psychology is accepting papers with a focus on child and adolescent mental health for an issue to be published in 2016. Editors for the issue will be Dr. Emily Edlynn and Dr. Marissa Schiel. A more detailed call for papers will be available in May 2015.

Please direct any inquiries about potential submissions to Drs. Edlynn and Schiel by emailing Ms. Giomara Macias at Giomara.Macias@childrenscolorado.org.

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From the Chair

Robert Freedman, MD

Opening the Table of Contents of the first volume of the Colorado Journal of Psychiatry and Psychology, I was immediately struck by the scope of clinical services and illnesses, and the expertise of the faculty who daily treat patients at The Colorado Children's Hospital. Even with a faculty as collegial as ours, in our daily work we take for granted the many different clinical experts who are among us, treating the wide diversity of illnesses that children suffer. I am proud that they have chosen to develop their expertise at Colorado, in its renowned Division of Child and Adolescent Psychiatry.

The writing of papers is a time-tested method to consolidate clinical expertise and make it available to students. This opportunity, once readily available to all good clinicians, has been increasingly reserved for researchers who are developing knowledge for the future. While some of them are indeed represented in this volume, most of the articles are written by clinician-teachers, who practice and teach evidence-based medicine today. The volume has had its intended role of including these clinical experts in the fellowship of writing and peer-reviewing, which my own chief, Daniel X. Freedman, termed the greatest college without walls.

As an editor myself, my special kudos to Drs. Oland and Sannar. Only another editor can appreciate how incredible their efforts and skill are to pull this volume together. Dr. Novins himself is a highly experienced editor. It was his dedication to the development of his faculty that is now in tangible form in this volume.

From the Editorial Staff

Alyssa Oland, PhD; Elise M. Sannar, MD; Douglas Novins, MD

The development of the first edition of the Colorado Journal of Psychiatry and Psychology has been an exciting journey! The idea to create such a journal began as our Division of Child and Adolescent Psychiatry, headquartered at Children's Hospital Colorado, developed its strategic plan. This strategy was guided by our division's long-standing commitment to provide high-quality behavioral health services to children and adolescents. At present, there are considerable unmet behavioral health needs for children and adolescents in Colorado. Our strategic plan identified areas for enhancement and expansion to better meet these needs. In planning for these areas of enhancement and expansion, our division and hospital wanted to be sure our efforts for growth and development were informed by best-practice standards in the field. As such, faculty volunteered to research information regarding etiology, assessment, and treatment in specific areas relevant to identified areas for growth. These articles helped guide our strategic planning efforts, and were revised for publication in this first volume of the journal.

We identified the following as areas for enhancement or expansion in our strategic plan: (1) behavioral health services in primary care settings, (2) services for young children, (3) services for youth with substance use problems, (4) services for children with comorbid medical and psychiatric concerns, (5) behavioral health services for children with autism spectrum disorders and intellectual disabilities, and (6) tertiary psychiatric treatment services for patients presenting with an acute psychiatric crises. We also have an overarching appreciation of the importance of providing culturally-sensitive services as the children and adolescents we serve come from diverse backgrounds. The articles in this journal focus on these targeted areas. As editors of this inaugural volume of the Colorado Journal of Psychiatry and Psychology, we have learned a lot from guiding the preparation of these articles for publication. We are excited to make this information, which has been so important to guiding our program development efforts, available to others in the larger community who are equally passionate about providing the highest quality services to children and adolescents with mental health problems and their families.

As stated by Benjamin Franklin, "Without continual growth and progress, such words as improvement, achievement, and success have no meaning." We strive to continually grow and improve upon the ways we serve the behavioral health needs of children and adolescents. As editors, we have certainly personally and professionally grown through reading and learning from these articles. We hope that you will enjoy them and learn from them as much as we did.

Obsessive Compulsive Disorder and Anxiety Disorders in Children and Adolescents

Benjamin C Mullin, PhD; Christine McDunn, PhD; Scot McKay, MD; Alyssa Oland, PhD

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Anxiety disorders are the most common form of psychopathology found in children and adolescents,[1] and they impart significant functional impairment. In recent decades, substantial progress has been made developing effective methods to assess and intervene with anxious youths, yet many afflicted individuals are never identified, or receive suboptimal forms of treatment.[2] In this brief review, we aim to summarize the current clinical understanding of pediatric anxiety disorders, including an overview of epidemiological findings, factors involved in risk and resilience, prognostic guidelines, and current findings regarding the assessment and treatment of these conditions. Given space limitations, we will focus on the most common anxiety disorders included in the fifth edition of the Diagnostic and Statistical Manual (DSM-5),[3] including generalized anxiety disorder (GAD), social anxiety disorder (SAD), separation anxiety disorder, specific phobia, panic disorder, agoraphobia, and posttraumatic stress disorder (PTSD). We also include obsessive-compulsive disorder (OCD) in this review, though in DSM-5 it is no longer grouped with the traditional anxiety disorders (it is now included in the chapter "Obsessive Compulsive and Related Disorders"). We made this inclusion given that, phenomenologically, OCD is a disorder characterized by significant anxiety, and the empirically-supported treatments for OCD overlap considerably with traditional anxiety disorders.

Prevalence

Determining the prevalence of anxiety disorders among young children is challenging, given that anxiety is often studied more broadly as a component of inhibited temperament in this age group without consideration of diagnostic thresholds. Nonetheless, the few studies of children between ages 2-8 suggest a prevalence of roughly 10% for all anxiety disorders, excluding OCD and PTSD, with an increase to around 12% in elementary school-aged children.[4] Specific phobias are the most common diagnosis in this age group (6.7%), followed by separation anxiety disorder (3.9%), SAD (2.2%), and GAD (1.7%).[5] In school-aged youths, the prevalence of OCD is believed to be around 2%-3%, with 2 peaks of incidence: the first in pre-adolescent children, and the second in young adults (ie, early twenties).[6] In adolescence, the overall rates of anxiety disorders remain similar (roughly 11%), with an increase in rates of panic disorder, which rarely occurs before mid-adolescence.[7] Rates of PTSD among adolescents have been estimated at 3.7% for males, and 6.3% for females,[8] though a significant additional portion of youth experience trauma-related impairment without meeting criteria for PTSD.[9] Overall, anxiety disorders appear to have an earlier onset than other forms of mental illness.

Several reports have suggested that females are at higher risk for developing anxiety disorders, with significant sex differences in overall rates of anxiety disorders emerging by age 6.[10] Yet follow-up studies seem to indicate that sex differences in rates of *individual* diagnoses tend to be relatively small. One report indicated higher rates of separation anxiety disorder among females during childhood, with higher rates of SAD and GAD among females during adolescence.[11] Interestingly, in pediatric OCD, there is a male preponderance (3:2).[5]

Risk Factors

Risk for developing a childhood or adolescent-onset anxiety disorder seems to be largely determined by interactions between biology and environment. Initial studies indicated higher rates of anxiety disorders among the children of parents with anxiety disorders.[12,13] Numerous family factors appear to increase the risk for developing anxiety disorders, including insecure attachment[14] and overprotective or highly critical parenting styles.[11] A combination of twin, adoption, and molecular genetic studies has highlighted roles for particular genetic polymorphisms (eg, 5-HTT) and negative life events (eg, low familial support). One study reported that the heritability estimate (ie, the proportion of risk for a particular condition that can be accounted for by genetic factors alone) for separation anxiety disorder was 73%, while for SAD it was 60%.[15] OCD has a strong genetic basis as well, with first-degree relatives of pediatric OCD patients having a 24%-26% morbid risk.[16] Another study exploring gene-environment interactions found that genes appeared to sensitize teens to the anxiety-producing effects of negative life events.[17] Among youths, a number of factors appear to increase risk for developing PTSD following a trauma, including previous trauma, preexisting psychiatric disorder, female gender, parental psychopathology, and lack of social support.[11]

Prevention

Given the prevalence and lasting impact of childhood anxiety disorders,[18–20] prevention and early intervention efforts are warranted. Prevention programs are categorized as universal, selected, or indicated.[21] *Universal* programs are targeted at an entire population, regardless of risk status; *selective* intervention programs are targeted at those who have been identified as being at risk, but do not yet have any signs of a disorder; and *indicated* intervention programs are targeted at those who are already presenting with subclinical symptoms, yet do not meet criteria for a disorder. In a meta-analytic review, indicated and selective anxiety prevention programs had stronger effect sizes than universal programs.[22] Therefore, community screening efforts may be worthwhile to identify those at risk using reliable anxiety screening instruments (described subsequently) or teacher nomination.[23]

Empirically-supported and modifiable risk factors for the development of anxiety disorders (inhibited temperament, parental anxiety, negative cognitive content, stressful life events, and response to stress) have guided the development of promising preventive programs. Recent meta-analyses support the efficacy of such programs (with effect sizes ranging from small to large), which primarily utilize components of Cognitive Behavioral Therapy (CBT), the treatment of choice for child and adolescent anxiety disorders.[24]

Group interventions at school or other community settings improve access to care and may decrease stigmatization. The *FRIENDS* program, a universal program delivered in the school setting, has shown promising results,[25] and is currently used in multiple countries with materials translated in multiple languages (http://www.pathwaystoresilience.org/our-patron/). A selective program designed for the parents of preschool-aged children with inhibited temperament (measured by inhibited and withdrawn behaviors) also showed lasting benefits into adolescence.[26] This program included psychoeducation about internalizing disorders, a focus on reducing parental overprotection and fostering greater child independence, systematic techniques to encourage in vivo exposure for the child, and encouragement to continue these techniques, especially during high risk times in the future, such as the start of each school year.

Another selective prevention program, The Child Anxiety Prevention Study, enrolled children and their parents with a diagnosed anxiety disorder in an 8-week CBT intervention and compared them to a waitlist. This program included parent-only and parent/child sessions focused on anxiety management/social engagement, cognitive restructuring, problem-solving skills, contingency management, and communication skills. At the 1-year follow up, 30% of those children in the waitlist group had developed an anxiety disorder compared to 0% in the active treatment group.[27] Programs that include or consist primarily of teaching parents how to manage anxiety in themselves and their children also appear to reduce future risk for youths.[24]

In addition, evidence that attention bias toward threatening stimuli may be causally related to anxiety symptoms[28] supports possible prevention efforts using computerized attention retraining/dot-probe tasks. Other automated and computerized interven-

tions showed promise, with 60% of anxiety programs yielding successful outcomes.[29]

With regards to PTSD, community-based screening should be conducted with children after events with the potential to traumatize witnesses. This screening should be done no sooner than 4 weeks after the event based on prior findings that roughly only 30% of those with symptoms immediately following a traumatic event will continue to have symptoms 1 month post-event.[30] Group interventions have been shown to be effective, such as Trauma-Focused CBT and the UCLA Trauma and Grief Component Therapy.[31] Universal programs that foster general resiliency in youth are being tested internationally to provide protection for children from adverse affects of traumatic events.[32]

Comorbidity

Anxiety disorders show high rates of concurrent and longitudinal comorbidity[33] with each other. In addition, youths with anxiety disorders were more than 27 times more likely to have a concurrent depressive disorder, and more than 3 times more likely to have attention-deficit hyperactivity disorder (ADHD) than those without an anxiety disorder diagnosis.[34] Early onset OCD is associated with risk for ADHD, separation anxiety disorder, specific phobias, and agoraphobia.[6]

Prognosis

The limited number of long-term longitudinal studies that have assessed anxiety suggest that these are persistent disorders that follow an intermittent course (ie, waxing and waning).[35,36] Indeed, studies of inhibited temperament indicate that reactivity to novelty in infancy predicts later development of SAD in adolescence.[37] Early anxiety disorders serve as risk factors for the development of other illnesses, particularly depression[38] and substance use disorders.[39] Other longitudinal studies have shown that adolescent anxiety disorders also predict subsequent suicidal behavior, educational underachievement, and early parenthood.[39] Over time, childhood-onset OCD often becomes subthreshold or remits altogether, though worse outcomes are predicted by earlier age of onset, increased duration of OCD, inpatient treatment, and the presence of specific symptom subtypes (eg, religious obsessions).[40] Longitudinal studies of PTSD show that many children show a gradual decrease in symptoms over time, without treatment. However a significant number of youths show chronic PTSD symptoms over many years.[41]

Assessment

When assessing for anxiety in childhood, it needs to be considered that having some anxiety can be a normal part of life and a youth's progression through developmental stages. To determine if anxiety in a youth meets criteria for an anxiety disorder, providers should consider the intensity, duration, and associated functional impairment of the symptoms. Providers also need to consider the socio-emotional developmental stage of the child, and what type and intensity of anxiety would be normative for that developmental stage. They should also screen for other psychiatric conditions, medical conditions, stressors, or traumas that might account for the anxiety symptoms.[42] It is important to consider that youth can present with several comorbid anxiety disorders, and that youth might also present with anxiety disorders comorbid with other psychiatric disorders, such as depression or ADHD.[42]

Brief anxiety screens provide a useful tool for identifying youth who require a more thorough evaluation and possible anxiety-focused treatment. There are numerous, brief self-report measures to assess pediatric anxiety; however, the Multidimensional Anxiety Scale for Children (MASC) and the Screen for Child Anxiety and Related Emotional Disorders (SCARED) appear to have the strongest psychometric properties, and are the most widely used.[43,44] The SCARED also has a parallel parent-report form that may be useful. (Note: A more thorough discussion of the many screening instruments is beyond the scope of this article, but for an authoritative review, see Silverman & Ollendick, 2005.) Generally speaking, it is important to use information from a range of informants (self-report, caregiver-report, and teacher-report), and to be sure that measures used with children are developmentally appropriate in their wording. Research suggests that, with very young children, play, drawings, and observation can be useful for assessment, particularly when combined with parent-report and teacher-report measures. It is believed that children are well able to report about their internal state in regards to

anxiety, and caregivers and teachers may not be as aware of the child's internal state, but are able to report functional impairment that might be present and not reported by the youth.[45]

A variety of structured diagnostic interviews that can be used include the Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Versions (ADIS), Child and Adolescent Psychiatric Assessment, Diagnostic Interview for Children and Adolescents, the NIMH Diagnostic Interview Schedule for Children Version IV, and the Schedule for Affective Disorders and Schizophrenia for School-Age Children. Of these, the ADIS is most recommended because it has been the most widely used, and has been shown to be valid and reliable in diagnosing anxiety disorders.[44]

Psychotherapy Approaches

Cognitive behavioral therapy (CBT) has long been considered an effective treatment for pediatric anxiety disorders. CBT for anxiety targets the cultivation of specific coping skills, including relaxation, cognitive restructuring, and reducing avoidance of anxiety-provoking situations through graduated exposures with response prevention (ERP). Several treatment manuals have been constructed incorporating these techniques, and have demonstrated effectiveness across the range of anxiety disorders.[46,47] In manualized treatments for pediatric OCD, ERP represents the primary focus with less emphasis on cognitive restructuring.[48] Trauma-focused CBT (TF-CBT) supplements elements of traditional CBT for anxiety with narrative exposure work and cognitive processing of the trauma, typically in conjoint parent-child sessions.[31]

The definitive study examining the effectiveness of CBT for pediatric anxiety disorders is the Child-Adolescent Anxiety Multimodal Study (CAMS), a multi-site randomized controlled trial comparing 12 weeks of individual CBT, sertraline, CBT + sertraline, and placebo in the treatment of SAD, GAD, and separation anxiety disorder for youths between 7-17 years of age. Overall, 59.7% of participants in the CBT group qualified as remitted, versus 54.9% in the sertraline group, 80.7% in the combined treatment group, and 23.7% in the placebo group.[49] A similar multi-site randomized controlled study was performed for pediatric OCD, called the Pediatric OCD Treatment Study (POTS), comparing 12 weeks of CBT, sertraline, CBT + sertraline, and placebo. Rates of clinical remission were 39.3% for CBT, 21.4% for sertraline, 59.7% for combined treatment, and 3.6% for placebo. Authors recommended CBT alone or CBT + sertraline as front-line approaches for pediatric OCD.[50] The largest randomized trial of TF-CBT found that in a sample of sexually-traumatized youth, 12 weeks of TF-CBT was superior to supportive psychotherapy, producing significant improvement in PTSD symptoms, depression, behavior problems, and shame-related attributions.[31] These improvements were largely preserved at 1-year follow up.[51]

There is now robust evidence suggesting that the effectiveness of CBT is long-lasting. One follow-up study assessed participants between 16-26 years of age, 8 to13 years after they had been treated for anxiety disorders using CBT. Over 95% remained in remission from their original target disorder, and the authors also reported low rates of new anxiety disorders.[52] Other follow-up studies (5 to 8 years post treatment) have found similar preservation of gains from CBT treatment of anxiety in children.[48,50,53] Importantly, although tightly-controlled (often university-based) efficacy trials have repeatedly shown strong effects of CBT for pediatric anxiety, several community effectiveness trials have often produced equivocal results between CBT and treatment as usual.[54–56] These findings are difficult to interpret, given that there is often "bleeding" of CBT-style interventions into standard community treatments, and they suggest the need for additional dismantling studies to identify critical mediators and moderators of successful treatment.

It should be noted that CBT interventions for pediatric anxiety have been implemented in a wide range of formats, from individual to group therapy, and with and without parents and other family members. While strong arguments have been made about the superiority of one format versus another, findings have not consistently found any advantages.[57] More recently, the Coping Cat manualized CBT intervention for pediatric anxiety was translated into a computerized format. In a randomized clinical trial, it proved equally effective to the traditional in-person individual therapy format.[58] Due to potential cost efficiency and dissemination advantages, computerized interventions for pediatric anxiety are being studied closely.

Pharmacotherapy Approaches

Most data suggest that the first line for the treatment of the majority of anxiety disorders in children and

adolescents is psychotherapy. However, for moderate to severe cases of anxiety, medications are indicated as a part of treatment.[42] Studies demonstrate that medications indicated for anxiety, including selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants (TCAs), buspirone, and benzodiazepines, are safe, tolerated, and efficacious in the child and adolescent population. Currently fluoxetine, sertraline, fluvoxamine, and clomipramine are the only FDA-approved medications for treating anxiety disorders (all having an indication for OCD only) in children aged 6 years and older. Additionally, the SSRIs have a black box warning for potential development of suicidal ideation in the pediatric population. However, these data come from the study of medications in relation to depression, not anxiety, which has called into question the risk of developing suicidal ideation on these medications when treating anxiety.[42]

The aforementioned CAMS study shed new insight into the use of psychotherapy and SSRIs in the treatment of anxiety in the pediatric population. This study employed flexible dosing of sertraline starting at 25 mg that could be adjusted up to 200 mg, with a mean dose of 133.7 mg (range 25-200 mg) in the combination group and 146 mg (range 25-200 mg) in the sertraline alone group. There were minimal to no adverse effects of sertraline noted during the study. Overall, CAMS showed not only that combination therapy is superior to CBT or SSRI alone, but also that CBT or SSRI alone can be effective and tolerated as well for the treatment of SAD, GAD, and separation anxiety disorder.[49] The aforementioned POTS study produced similar results with respect to SSRI treatment of pediatric OCD.[50] POTS also used a flexible dosing schedule for sertraline, starting at 25 mg, which could be adjusted up to 200 mg. The median doses of sertraline were 150 mg in the combination group, and 200 mg in the sertraline alone group. Again, this study found the combination therapy superior to CBT alone, which was superior to sertraline alone. As in CAMS, sertraline was highly tolerated with no switches into mania or increased suicidality in the study groups, and only 2 participants withdrew from the study due to adverse effects. POTS found that combination CBT and SSRI treatment led to better remission in OCD than either modality alone, with CBT alone outperforming medication alone.

Other randomized controlled trials of SSRIs for anxiety in the pediatric population have generally reported positive results. A meta-analysis of pediatric anxiety psychopharmacology trials showed that 59% responded on SSRI treatment compared to 31% on placebo, with no indication of differences in efficacy among the SSRIs (yet authors noted the lack of head-to-head trials).[59] Most of the evidence for SSRIs is strongest in regards to the treatment of OCD.[59] The same meta-analysis showed evidence that fluoxetine and paroxetine could improve functioning with short-term use, but no evidence that fluoxetine could prevent relapse with long-term use. The review also noted a large portion of study participants leaving SSRI studies for reported adverse effects, especially at higher doses of the SSRIs, leading the authors to recommend using lower doses of these medications and titrating up as tolerated. Evidence for SSRIs in the treatment of pediatric PTSD is more limited, and 2 randomized trials in this population found limited support for their efficacy.[49,59] The American Academy of Child and Adolescent Psychiatry's (AACAP) Practice Parameter on the treatment of pediatric anxiety recommends choosing an SSRI based on the side effect profile, duration of action, and positive response to a particular SSRI in a first-degree relative.[42]

Industry-sponsored placebo-controlled trials provide some initial evidence for the effectiveness of the serotonin norepinephrine reuptake inhibitor (SNRI) venlafaxine in treating both SAD[60] and GAD[61] among children and adolescents. For pediatric anxiety, the Cochrane review noted no differences in the tolerability of venlafaxine compared to the SSRIs.[59] However, one trial did report a difference in subject heights after treatment of those in the venlafaxine arm versus the placebo arm.[61] TCAs are less used in clinical practice since the advent of the SSRIs, yet there is some evidence behind them in the treatment of pediatric anxiety disorders. TCAs are no longer routinely used due to the need for cardiac monitoring, multiple side effects, and medical risk with overdose. Imipramine has equivocal data in regards to separation anxiety and school phobia.[42] Clomipramine, on the other hand, has strong data in regards to the treatment of pediatric OCD.[62] Despite some good evidence, TCAs are still considered second-line for pediatric OCD due to similar response rates to the SSRIs that have more favorable side effect profiles.

Buspirone is a serotonin 5-HT 1A partial agonist FDA-approved for anxiety in adults, yet it has minimal data to support its use in pediatric anxiety. Similarly, multiple studies indicate that benzodiazepines are equivalent to placebo in the pediatric population.[42,59] Due to a lack of efficacy evidence and severe side effects, it is recommended that benzodiazepines not be used with children and adolescents, or at best reserved for severe cases and used as acute treatment.

Recommendations for Practice

Evidence suggests that pediatric anxiety disorders are impairing, and often persist and potentially contribute to the development of other psychiatric problems throughout development. Systematic screening for pediatric anxiety disorders using one or more of the aforementioned validated screening instruments is critical, and should be integrated into the intake procedures in all pediatric and child psychiatric clinics.

It is recommended that clinicians assess anxiety using a multi-informant approach, as this is likely to provide a more complete picture of overall symptomatology and impairment. A large body of research suggests that both CBT and SSRIs are effective, particularly when combined, in the treatment of pediatric anxiety disorders, and in the case of CBT, treatment gains are often preserved 5 or more years out. TF-CBT is the first-line treatment for youths with PTSD symptoms, with medications playing a more supplementary role, possibly to treat symptoms of comorbid conditions. Preventive interventions, particularly those incorporating aspects of CBT and directed toward youths (and their families) who are experiencing subthreshold anxiety symptoms, may be effective in preventing the eventual onset of anxiety disorders.

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The Evidence Base for the Assessment and Treatment of Attention-Deficit/Hyperactivity and Oppositional Defiant Disorder

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Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD)

ADHD is a common, often chronic, treatable childhood psychiatric illness, characterized by a pattern of developmentally inappropriate inattention, motor restlessness, and impulsivity that affects from 5% to 9% of school-aged children.[1] The incidence of ADHD has been estimated as high as 12% in child behavioral health outpatient populations, and 20% of inpatient populations. The predominantly inattentive type is relatively more common in females.

ADHD often goes unrecognized and untreated as demonstrated by a recent study, which found that among a community sample of 3,082 youngsters, only 52.1% of patients found to meet criteria for ADHD had been previously identified, and 68% of those identified had not received treatment.[2] ADHD has been associated with high levels of comorbidity, impairment, and persistence into adolescence and young adulthood.[1] Taken together, these characteristics make early recognition and treatment of ADHD of paramount importance. Treatment options include behavior management, medication alone, or a combination of the two.

Oppositional Defiant Disorder (ODD)

ODD is considered the less severe of the 2 major disruptive behavioral syndromes of childhood, the other being Conduct Disorder. ODD has been estimated to occur in about 3% -15% of children, with boys having only a marginally higher prevalence rate than girls.[3]

While some of the characteristics of ODD might be typically observed during toddlerhood or adolescence, the DSM criteria that specify both clinically significant symptomatology for a minimum of 6 months typically excludes these developmentally-appropriate behaviors.

Children with ODD demonstrate argumentative, disobedient, and defiant behavior, most commonly with authority figures such as parents or teachers, although such interactions can also be noted in relation to their own peers. They are sometimes portrayed as being stubborn and unnecessarily negativistic, often adopting a self-defeating stance with authority figures. For example, children with ODD are often willing to lose a privilege or toy, or accept a difficult consequence, rather than lose an argument or concede a previously adopted position of defiance. Children with ODD are experienced as being provocative, as they will often delay, procrastinate, or resort to sneaky or devious behavior to undermine an established rule or routine at home.

Etiology and Pathophysiology

ADHD

Genetic factors are implicated in ADHD, but their mechanisms of action are not completely understood. ADHD very likely results from a mixture of dominant and recessive major genes that act with complex polygenic transmission patterns.[4] Twin, family, and adoption studies of ADHD have supported a strong genetic contribution to the disorder, with heritability estimates ranging from 60%-90%.[4,5] Genetic studies

have demonstrated that ADHD symptoms are often associated with alterations in genes involved with catecholamine transmission.[6] More recent research highlighted genes involved with dopamine (DA) transmission, and found associations with the DA D1, D4, and D5 receptors, and the DA transporter.[7-9] Also reported are associations of ADHD with norepinephrine (NE) genes, including the synthetic enzyme for NE, dopamine-beta-hydroxylase, the NE transporter as well as the Alpha-2 Adrenergic (α2A) receptor, which is the site of NE's beneficial actions in the Prefrontal Cortex (PFC).[10-12] Such suboptimal catecholamine regulation in the PFC may contribute to the impaired attention, impulsiveness, and hyperactive behavior observed in patients with ADHD.[13]

There is increasing evidence that the frontostriatal network is a likely contributor to the pathophysiology of ADHD. This network involves the lateral PFC and its connections to the dorsal anterior cingulate cortex, caudate nucleus, and putamen. In subjects with ADHD, reductions in total cerebral and gray matter volume have been observed, particularly in the PFC, basal ganglia (striatum), dorsal anterior cingulate cortex, corpus callosum, and cerebellum.[14]

The PFC is important for sustaining attention over a delay, inhibiting distraction, and dividing attention. The PFC in the right hemisphere is especially important for behavioral inhibition. Lesions to the PFC produce a profile of distractibility, forgetfulness, impulsivity, poor planning, and locomotor hyperactivity. The PFC is very sensitive to its neurochemical environment, and either too little (drowsiness) or too much (stress) catecholamine release in the PFC weakens cognitive control of behavior and attention.[15,16] Other notable findings include evidence that norepinephrine enhances *signals* through postsynaptic α2A receptors in the PFC, while dopamine decreases *noise* (or distraction) through modest levels of D1 receptor stimulation.

Environmental influences have also been demonstrated to play in role in the etiology of ADHD; children exposed prenatally to alcohol can become hyperactive, disruptive, impulsive, and are at an increased risk for a range of psychiatric disorders.[17] Maternal smoking produces a 2.7-fold increased risk for ADHD,[18] and a dose-response relationship between maternal smoking during pregnancy and child hyperactivity has been reported.[19] This is hypothesized to be due to an effect on nicotinic receptors, which modulate dopaminergic activity.[20] Additional perinatal factors have also been implicated, with a 2-fold increase in ADHD in very low-birth weight children, and an increased rate of pregnancy and birth complications in mothers of children later diagnosed with ADHD.[21] Among postnatal factors, a role for malnutrition and dietary deficiency in ADHD has been proposed.[22]

ODD

Several psychosocial factors have been proposed in the genesis and perpetuation of ODD, in addition to neurobiological and temperamental characteristics. Parents with insufficient time and emotional energy may predispose the child to seek their attention in maladaptive ways. Inconsistent methods of limit setting, disciplining, and setting structure could contribute to deficient internal working models of social interaction.[23] A child identifying with a parent who is also stubborn, unpredictable, and negativistic in family and social interactions as a role model could be expected to demonstrate disobedient and defiant behavior.[24]

Langbehn et al[25] suggested that symptoms of ODD in high risk, adopted males may be linked to genetic traits leading to adult antisocial personality. In a sample of clinic-referred boys with ODD, 44% developed CD over a 3-year period.[26] Risk factors for progression to Conduct Disorder include poverty, young maternal age at first childbirth, and parental substance abuse.[26] Physical fighting, low socioeconomic status of the parent, ODD, and parental substance abuse have also been shown to predict the onset of CD. Attention-deficit hyperactivity disorder (ADHD) predicted an early onset, but not later onset, of CD.[27]

Differential Diagnosis and Comorbidity

ADHD

ADHD commonly co-occurs with other medical and psychiatric conditions.[28] Studies suggest that as many as 67% of children with ADHD have a coexisting condition such as an additional psychiatric problem, learning disability, or developmental delay.[29] The psychiatric conditions most likely to be found comorbid alongside ADHD include: ODD (prevalence of 35% in ADHD), conduct disorder (prevalence of 30% in ADHD), anxiety disorder (prevalence of 25% in ADHD),

and mood disorder (prevalence of 18% in ADHD).[28] Additionally, other genetic conditions often masquerade as ADHD and vice versa.[30] Acute and chronic psychosocial stressors may influence child behavior and functioning through mediation of hypothalamopituitaryaxis functioning, so all environmental systems connected to a child, including family and school, should be assessed.[31]

Dependent on both the specific definitions used and the research setting, 12% to 60% of children who have ADHD may have a coexisting learning or language delay.[32] A Disorder of Written Language is the most common disability found together with ADHD.[33] Because most children who have ADHD experience academic underachievement, it is important to distinguish whether a learning disability also is present.[34]

ODD

Common comorbidities with ODD include ADHD, learning disabilities, mood disorders (depression, or bipolar disorder), and anxiety disorders. The recognition and prompt treatment of such conditions is essential, as it may be difficult to improve the symptoms of ODD without treating the coexisting disorder; such delay may lead to rapid deterioration in the parent child relationship and preventable disciplinary issues in the classroom. A proportion of children with ODD may go on to develop conduct disorder.

Clinical Assessment

ADHD

The American Academy of Child and Adolescent Psychiatry's Practice Parameter for the Assessment and Treatment of Children and Adolescents with Attention Deficit/Hyperactivity Disorder[1] provides a detailed approach to assessment, which is briefly summarized here. Preliminary assessment for ADHD occurs via a clinical interview, which should involve the child and caregivers. Further screening for the number, severity, and settings of ADHD symptoms is commonly achieved through the collection of symptom checklist or rating scales that may be completed by the patients, caregivers, and teachers, depending on the instrument chosen. Information must be gathered from collateral sources to assess whether symptoms are evident, across raters and settings, as ADHD, which, by definition, presents pervasively. Because the DSM-5 symptoms for ADHD were not formulated via a scientifically rigorous process, and because there is a good deal of criterion overlap with other conditions, it is challenging to establish a rating scale or scoring symptom that can definitively ascertain whether or not a specific child has ADHD. Therefore, ADHD-specific rating scales are not diagnostic. However, they may be used to gather information about the child's behaviors from the parent, and/or teacher. These rating scales assess the core symptoms of ADHD, as specified in the DSM 5, and they are relatively easy to administer.[28]

The utility of the rating scales rests in the fact that they are comprised of DSM 5 symptoms.[35] Rating scales probably are most useful in documenting whether the rater sees the core symptoms as being present for a specific child compared with his or her same-age peers. The clinician also should recognize that ADHD-specific rating scales differ in their normative data.[35] For example, normative data for the Connors Scales and the Attention Deficit Disorder Evaluation Scale (ADDES-3) were formulated based on discrete age ranges (eg, comparing ages 3 to 5, and 6 to 8); whereas other scales, such as the ADHD-Symptoms Rating Scale (ADHD-SRS), established normative data based on broader age ranges (eg, 5 to 12 years, and 13 to 18 years).[32] Only the Connors Scales have normative data for preschool-age children. Normative data also may differ by race, sex, and geographic area. Therefore, when using a rating scale, it may be difficult to interpret the results if the clinician's particular patient sample is not represented in the scale's normative data.[36,37]

Rating scales also may be used to measure behavioral changes that occur over time or in response to treatment. However, few studies have been published describing their diagnostic utility in this context. Many of the ADHD rating scales also provide screening questions for comorbid conditions.[38]

Evidence-Based Interventions for ADHD and ODD

Psychosocial Treatments

There are several major factors to consider when making a choice about what intervention strategies to use with children who display disruptive behavior, including ADHD and ODD. These factors include the quality of the research base (including documented

treatment outcomes), the ease and practicality of implementation for the population to be served, and the type of training and infrastructure needed.[36,37] Dozens of psychosocial treatment protocols have been established as efficacious for disruptive behavior disorders. The following content focuses on the Triple P (Positive Parenting Program), Parent Management Training, and Parent Child Interaction Therapy, which are among the most widely deployed and well established.[39] The 2013 SAMA's publication provides a thorough, evidence-based overview of available psychosocial treatments when working with children with impulsive behaviors.

Triple P (Positive Parenting Program). Triple P is a multi-level system of parenting and family support programs that apply to prevention, early intervention, and treatment.[39] The developers are Mathew Sanders and his colleagues from University of Queensland in Australia. The program is used in a number of countries, including 9 states in the U.S. The intent of Triple P is to prevent or reduce behavioral, emotional, and developmental problems in children. This reduction in symptoms is accomplished by enhancing the skills, knowledge, and confidence of the key people in children's lives: their parents. It is designed to be used with children from birth to 16 years, and can be delivered by a range of professionals in primary care (nurses and physicians), mental health, and educational settings (family/parent liaisons, day care personnel, and school counselors). It is available in 10 different languages, and cultural adaptations can be made depending on the targeted population.[40]

The intervention offers 5 different levels of service that increase in intensity as a child and family's need increases. Level 1 is a prevention approach, and is more informational in nature. Level 2 begins using a brief elective intervention aimed at parents with specific concerns about their child's behavior and/or development. Level 3 begins to narrow the intervention to a very specific concern from the parents. The sessions become longer and more frequent at this level. By Level 4, there is a broadened parent training intervention for those who want to increase their positive parenting skills. Level 5 is the "Enhanced Triple P." The intervention at this level is intensive and tailored for families with increased problems and additional stressors (eg, parent depression or divorce).

Triple P has been studied extensively since 1977, and has a strong research base. There are 29 randomized clinical trials, 11 controlled single-subject studies, 9 effectiveness trials, and 6 dissemination trials. An interesting and innovative RCT was done looking at the culturally and ethnically diverse children in China.[39] The settings of implementation have also been diverse, spanning both mental health and community settings.

Parent Management Training-Oregon (PMTO). The PMTO model, based on social interaction therapy, was originally developed in the 1970's by Gerald Patterson, Marion Forgatch, and their colleagues at the Oregon Social Learning Center.[39] PMTO is both a behavioral prevention and clinical intervention model. It focuses on enhancing effective parenting, while reducing coercive parenting practices. The program is widely disseminated in Norway, the Netherlands, and in 13 sites in the U.S.

PMTO is designed for children aged 4 to 12 years old who display serious disruptive behaviors. The typical setting of implementation is the clinic, but it can also be delivered in the home. The intervention is delivered by trained providers (typically master's level-prepared professionals) over 20 sessions. However, the number of sessions can be modified to meet the needs of an individual family. The intervention requires participation of children and parents.

PMTO is a manual-based intervention with the following 5 essential components: (1) skill encouragement, which teaches pro-social development by breaking behaviors down into small steps and contingent positive reinforcement; (2) discipline, which decreases negative behavior using contingent and appropriate mild sanctions; (3) monitoring or supervision of activities, peers, and location of children and youth, which helps the parents ensure a safe environment for their children; (4) problem solving skills, which help the family to negotiate agreements and set rules; and (5) positive involvement, which assists parents with offering loving, positive attention. The infrastructure and staffing requirements are relatively modest, and training materials are readily available. The materials have been translated into 4 different languages, including Spanish. All materials can be found at Implementation Sciences International, Inc. (http://www.isii.net).

PMTO has been evaluated extensively in community settings. There are also a number of comparison

studies done using random assignment. Other studies using control groups have yielded promising results. Research to-date supports the claim that treatment effects may be generalized across settings, and effects are maintained for up to 2 years. There is also some evidence to suggest that the treatment effects extend to other deviant behaviors beyond those that are the primary focus of the treatment.

Parent-Child Interaction Therapy (PCIT). PCIT is a parent training/coaching program for families with children 2 to 7 years of age who are displaying disruptive behaviors. The program was originally developed in 1982 by Shelia Eyberg at the University of Florida, and was influenced by the earlier work of Constance Hanf and Diane Baumrind.[39] The intervention has been implemented in both the United States and in 3 other countries, in laboratory clinical settings, community mental health systems, Head Start programs, schools, and foster care settings.

PCIT is broken down into 2 phases, and its components are based on attachment and social learning theories. In the first phase—Child Directed Interaction—the parents learn how to strengthen their attachment through demonstrations of warmth, responsiveness, and sensitivity, in response to their child's behavior. The second phase—Parent Directed Interaction—involves the parents learning how to be effective authority figures by giving directions in age-appropriate, positive ways, while setting consistent limits and learning how to appropriately implement consequences (ie, time out).

The intervention is structured through 10 to 16 weekly, 60-minute sessions with either the parent alone or the parent and child dyad. Trained masters or doctoral-level therapists deliver the intervention. The treatment begins with an assessment of the family functioning, moves to teaching in the 2 phases mentioned above, and then to generalization, homework, and post-treatment assessment. The therapist monitors the client's progress through the treatment. In research settings the monitoring is done via a one-way mirror with a "bug" in the ear of the parent (ie, an earphone through which the therapist can assist the parent in the interaction with the child). In community settings, some adaptations have been made, such as a live observation in the families' home or in the child's school setting; it is not yet clear what impact those changes had on the fidelity of the intervention.

PCIT has been tested in a number of replication and follow-up studies and has been found to be effective in improving the interaction style of parents, and in improving behavior problems of children at home and in school.[41] This is in comparison to waitlist control groups, classroom control groups, and modified treatment groups.[41] There is also promising support for the culturally sensitive adaptations of PCIT.[42]

There are some noteworthy implementation challenges to consider when contemplating the use of PCIT as a primary intervention. First, it is recommended that the clinical setting be structured similarly to the conditions used in the research setting (eg, a one-way mirror and a bug in the ear).[43] There is also a considerable time and financial commitment from clinical staff. The estimated cost per clinician trainee is $3000, plus there is additional cost for the equipment needed to deliver the intervention. Training materials, workshops, on-going consultation as well as supervisor training is also available (http://pcit.phhp.ufl.edu/General_Workshop.htm).

Psychosocial Treatment Summary Tables

	Triple P-Positive Parenting	Parent Management Training-Oregon	Parent Child Interaction Therapy
Type of EBP	Prevention/Multilevel	Intervention	Intervention
Settings	Clinic, Home, School	Clinic, Home	Clinic
Ages	0-16	4-14	2-17
Training materials available	Yes	Yes	Yes
Outcomes	Increase in parental confidence, improvements in dysfunctional parenting style, reduction in child behavior problems	Significant reduction in child's behavior problems, reductions in coercive parenting, increases in effective parenting	Improvement in parent-child interaction style, improvement in child behavior problems

Table 1. Psychosocial Treatment Summary Tables.

Psychopharmacologic Treatments of ADHD

Rationale. Among the psychiatric conditions occurring in childhood, ADHD stands out as one with a relatively robust evidence base for pharmacologic interventions.[44] Stimulants have long been definitively established as first-line pharmacologic interventions for ADHD, with effect sizes averaging between .9-1.1.[45] Alpha adrenergic agents and the noradrenergic re-uptake inhibiter, atomoxetine, are regarded as second-line treatments for ADHD, with effect sizes ranging between .5-.7.

Data from the Multi-Modal Treatment of ADHD Study (MTA Cooperative Group, 1999),[46] functional and structural brain imaging,[47] and genetic and familial studies,[48] have increasingly demonstrated that this condition has significant heritability, along with clear neurophysiological or biological underpinnings. These findings, factored together with other variables, such as insufficient access to pediatric mental health specialty care and evidence-based behavioral treatments, have increasingly spurred a shift to medication strategies, as the primary and sometimes solo treatment for ADHD.[44]

Over 20 long-acting formulations of stimulant medication have evolved over the past few decades, not only leaving practitioners a multitude of options, but also necessitating a broadening of knowledge base and sophistication related to prescribing for ADHD.[49] The myriad and ever-expanding pool of varied formulations of stimulants and non-stimulants has led to increased confusion and errors in the prescribing and dispensing of these drugs. Knowing and understanding the advantages and disadvantages of the different formulations can facilitate optimal and customized treatment. Formulations like Concerta (OROS-methylphenidate), Adderall-XR (mixed amphetamine salts extended release), and Vyvanse (lisdexamfetamine) provide the convenience of once-daily dosing. Each of these formulations delivers a varied amount of stimulant at predictable time intervals throughout the day. Vyvanse has a unique delivery system that may lower the risk for patients abusing or diverting their medication. Daytrana (methylphenidate patch) can be given to patients who are unable to swallow pills and additionally confers flexibility over effect duration, via the choice of time when the patch is removed. For patients who cannot swallow tablets or capsules, the capsules of Focalin-XR (dexmethylphenidate extended release), Adderall-XR, Metadate-CD (methylphenidate extended release), and Ritalin-LA (methylphenidate LA) can be opened and sprinkled in applesauce or yogurt.

Stimulants. The stimulants can be divided into 2 broad categories: methylphenidate and amphetamine-derived products. There are currently over 20 long-acting stimulant formulations on the market, employing a myriad of technologies for medication administration, delivery, absorption, and metabolism. The products introduced during the past 1-2 decades have been specifically designed to overcome a phenomenon known as *tachyphylaxis*, which refers to an imme-

diate tolerance to stimulants that develops and must be overcome throughout the course of a given day, in order that the medication retain its efficacy for an extended period.[49] The first generation of sustained release stimulant products, which included Ritalin SR (methylphenidate sustained release) and Dexedrine Spansules (dextroamphetamine sustained release), predated the discovery of the tachyphylaxis phenomenon, and therefore were not inclusive of a delivery mechanism designed to overcome this impediment to prolonged duration of effect.

One strategy for overcoming tachyphylaxis involves the use of repeated doses of shorter-acting products delivered at distinct times, such as at the zero and 4-hour marks, using either regular, short-acting stimulants, or beaded formulations, which contain beads coated with short-acting and long-acting membranes. Examples of medications using this beaded, bimodal strategy include Ritalin LA, Focalin XR, Metadate CD, and Adderall XR. Another methodology for overcoming tachyphylaxis is the use of a capsule containing multiple layers of membranes and an osmotic pressure delivery system that generates an ascending dose curve, or increasing blood levels as the day transpires, an example of which includes Concerta. Vyvanse and Daytrana also produce pharmacokinetic profiles associated with an ascending dose curve as their mechanism for addressing tachyphylaxis.

	Onset of Action	Peak Clinical Effect Pharmacokinetic Profile	Duration of Action	Typical # Daily Doses
Short-Acting Preparations				
Regular MPH	20-60 minutes	~ 2 hours; range 0.3-4 hours	2-4 hours	2-3
AMPH	20-60 minutes	1-2 hours	3-6 hours	2
Regular MAS	30-60 minutes	1-2 hours	3-6 hours	2
First-Generation, Sustained-Release Preparations (Older Delivery Systems)				
MPH-SR *Metadate ER* *Methylin ER*	60-90 minutes	~ 5 hours; range 1.3-8.2 hours	4-6 hours	2
AMPHSpanulesSpansules	60-90 minutes	NA	4-6 hours	2
Second-Generation, Extended-Release Preparations (Newer Delivery Systems)				
MPHCD *Ritalin-LA*	30 minutes-2 hours	Bimodal pattern†	6-8 hours	1
OROS MPH	30 minutes-2 hours	Ascending pattern†	10-12 hours	1
MASXR	1-2 hours	Bimodal pattern†	10-12 hours	1
LAMPH	1-2 hours	Ascending pattern†	10-12 hours	1
MPH Patch	1-2 hours	Ascending pattern†	10-12 hours	1
DMPH XR	1-2 hours	Bimodal pattern†	6-8 hours	1

Table 2. Stimulant Medications Available for the Treatment of ADHD (adapted from Spencer[45] and Chavez[49]).

Legend: MPH=Methylphenidate, AMPH=Dextroamphetamine, MAS=Mixed Amphetamine Salts, DMPH=Dexmethylphenidate, LAMPH=Lisdexamfetamine, XR=Extended Release, SR=Sustained Release, CD=Continuous Delivery

Although there are a variety of long-acting stimulant products designed to be dosed once daily, there is substantial variation in the drug delivery mechanisms, along with the expected duration of effect and adverse event profiles. The bulk of these products are represented in the table below, with typical ranges for their expected onset, peak levels, duration, and number of daily doses.

Stimulant dosing is estimated based on the child or adolescent's weight in kilograms. Regardless of the duration of effect, mechanism of delivery, or number of daily doses, the total amount of *methylphenidate* administered can be calculated using an expected range of 0.5-2.0 mg/kg/day.[45] Exceptions include Focalin products and Daytrana, with Focalin's potency estimated to be roughly double that of regular methylphenidate products. Daytrana has a higher potency as well, roughly 1.5 times that of immediate release methylphenidate, with the following estimated equivalencies: 10 mg Daytrana = 15 mg Regular Ritalin (methylphenidate), 15 mg Daytrana = 22.5 mg Regular Ritalin, 20 mg Daytrana = 30 mg Regular Ritalin, and 30 mg Daytrana = 45 mg Regular Ritalin.[49] Generally, the *optimal* total daily amount of methylphenidate given will range between 0.6-1.0 mg/kg/day. Within this range, maximum benefit is generally achieved with concurrent excellent tolerability. Rarely would a child or adolescent require dosing of typical methylphenidate products in excess of a total of 1.0 mg/kg/day. Aggressive methylphenidate dosing above that benchmark has been associated with clinically significant adverse effects, including growth retardation, emotional lability, sleep disturbances, and even auditory hallucinations.[50,51]

Regardless of the duration of effect, mechanism of delivery, or number of daily doses, the total amount of *amphetamine* administered can be calculated using an expected range of 0.3-1.5 mg/kg/day.[45] An exception includes Vyvanse, whose potency is less than that of other amphetamine products. The estimated equivalences include the following: 30 mg Vyvanse = 10 mg Adderall (mixed amphetamine salts), 50 mg Vyvanse = 20 mg Adderall, and 70 mg Vyvanse = 30 mg Adderall. Aside from Vyvanse, amphetamine products are roughly 1.5 times as potent as methylphenidate products, so their dosing will be roughly two-thirds of what might be used with typical Ritalin products. Generally, the optimal total daily amount of amphetamine given to achieve significant benefit while minimizing side effects should range between 0.3-0.7 mg/kg/day. Rarely would a child or adolescent ever require dosing of typical amphetamine products in excess of a total of 0.8 mg/kg/day. Aggressive dosing above that benchmark has been associated with clinically significant adverse effects, including growth retardation, emotional lability, sleep disturbances, and even auditory hallucinations.[50,51]

Alpha Adrenergic Agents

Alpha Adrenergic Agents. The 2 alpha adrenergic agents commonly used as second-line monotherapy or adjunctive therapy, combined with stimulants for ADHD, include guanfacine and clonidine. These 2 medications have been widely used for many decades, based primarily on clinical lore. A dearth of data from controlled trials was available to establish their safety and efficacy for the indication of ADHD. However, in recent years, both agents were developed into extended release products, which have been well studied in controlled trials, and each new formulation received Federal Drug Administration (FDA) approval for the indication of ADHD.

Intuniv (guanfacine extended release) is available in the strengths of 1, 2, 3, and 4 milligrams (mg). Its safety and efficacy have been documented via at least 2 randomized, controlled trials, ranging from 8-9 weeks in duration, with subject pools of 345 and 324, aged 6-17 years. Intuniv was significantly effective for school-aged youth, but not for adolescents. However, the fixed-dose methodology, used in 25% of subjects, did not account for variability in subject size, age, and weight, which was conjectured as the probable explanation for failed demonstration of efficacy in the older cohort.

Kapvay (clonidine extended release) has been approved by the FDA as monotherapy for ADHD, as well as adjunctive therapy, with a stimulant. Its safety and efficacy were demonstrated via at least 2 randomized, controlled trials, with a subject pool of 236, aged 6-17 years. Two fixed doses, 0.2 mg and 0.4 mg, were found to be significantly impactful on ADHD symptoms, with roughly comparable tolerability and efficacy, and an effect size of 0.7.[45]

Atomoxetine. Atomoxetine's safety and efficacy are well established via over 20 randomized controlled trials involving several hundred subjects aged 6-17

years.[52] It has been studied as an adjunctive treatment, in combination with stimulants, and is recommended for patients who either cannot tolerate a full therapeutic dose of stimulants, or as monotherapy for children in whom stimulants might be contraindicated. A once-daily dosing regimen performed equivalently to a twice-daily dosing regimen, and the effect size ranged between.5-.7. The most common adverse effect is sedation, so preferred time of administration is before bed.

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Schizophrenia Spectrum and Other Psychotic Disorders in Children and Adolescents

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Introduction

There are multiple causes of psychosis, including both psychiatric and medical. Schizophrenia, the main focus of this article, is one of the most notable. Schizophrenia is believed to have occurred in mankind throughout history, and is generally associated with significant morbidity. The World Health Organization ranks it among the most disabling and economically catastrophic medical disorders, and one of the top 10 illnesses contributing to the global burden of disease.[1] Schizophrenia occurs in approximately 1% of the population worldwide. It affects men and women equally, but men tend to manifest symptoms on average 5 years earlier than women.[2]

The concept of schizophrenia and psychosis has evolved for well over a century. There is general consensus that schizophrenia is a neurodevelopmental disorder; the final presentation of the illness is the end state of a complex pathological neural developmental process that started years before the onset of the illness.[3] Studies support a multidimensional model, with the interaction of environmental and genetic influences leading to a complex syndrome of insidious onset and varied presentation.[3]

Schizophrenia was first identified as a discrete mental illness by Dr. Emile Kraepelin in 1887, who termed it *dementia praecox*.[4] The Swiss psychiatrist, Eugene Bleuler, coined the term, "*schizophrenia*" in 1911; it is derived from the Greek roots, *schizo* (split) and *phrene* (mind), to describe the fragmented thinking of people with the disorder. Bleuler was also the first to describe the symptoms of the illness as "positive" or "negative."[5]

Approximately one-third of first episodes of schizophrenia occur before age 19,[6] hence child and adolescent psychiatrists are likely to encounter a number of patients with adolescent or even younger onset illness. Early-onset schizophrenia (EOS) refers to individuals who have developed the full illness before age 18, and childhood onset schizophrenia (COS; onset before age 12) is a subset of EOS. The diagnostic validity of schizophrenia in children younger than 6 has not been established, though a few cases have been reported.[7]

Diagnostic Considerations

DSM II, published in 1968, was the first manual to include disorders of childhood. The concept of schizophrenia at that time was broad, and included children with developmental disabilities in addition to those with psychotic symptoms. Since DSM III, published in 1980, the criteria for diagnosis of schizophrenia in youth have been essentially the same as those for the diagnosis in adults.

The DSM-5 chapter on "Schizophrenia Spectrum and Other Psychotic Disorders" includes schizophrenia, delusional disorder, brief psychotic disorder, schizophreniform disorder, schizoaffective disorder, substance/medication-induced psychotic disorder, psychotic disorder due to another medical condition, and schizotypal personality disorder. These disorders are all defined by symptoms in 1 or more of the following 5 domains: delusions, hallucinations, disorganized thinking or speech, grossly disorganized or abnormal motor behavior (including catatonia), and negative symptoms.[8] Catatonia is conceptualized differently in DSM-5. It is not a class in itself, but can occur in association with a number of psychiatric and medical conditions, including schizophrenia. The cluster A personality disorders—schizotypal, para-

noid, and schizoid—are considered to be related to psychotic disorders.

The current diagnostic criteria for schizophrenia (DSM-5) requires the presence of 2 or more characteristic symptoms (hallucinations, delusions, disorganized speech, disorganized or catatonic behavior, and/or negative symptoms), a decline in social or occupational functioning, and evidence of the disorder for at least 6 months. The subtypes (paranoid, disorganized, catatonic, residual, and undifferentiated) have been eliminated.

Attenuated psychosis syndrome (APS) has been included in the appendix of DSM-5 as a condition for further study. Symptoms are psychosis-like, but below the threshold for a full psychotic disorder. Preventive strategies, including psychotherapy and antipsychotic medication, typically target this early phase. Though there is general agreement among researchers about the existence and importance of this syndrome, there is debate about whether it should be in the main body of DSM-5. Concerns include the fact that it cannot be reliably diagnosed in community settings, and that the majority of individuals diagnosed with APS do not go on to develop schizophrenia or full-blown psychosis.[9] There is the risk that they may be exposed to unnecessary and potentially harmful interventions.[10]

In the EOS research literature, the terms *clinical high risk* (CHR) and *at risk mental state* are both used to refer to what was formerly known as the *prodrome*. Their criteria are overlapping, but not synonymous. These terms are preferred over prodrome as not all individuals at risk will eventually develop the full illness. APS was a compromise set of criteria between both sets of research criteria, and input from less-biased individuals outside the field.

Course of Illness

Schizophrenia is unique among psychiatric disorders in that distinct phases are recognized. Not all individuals with schizophrenia pass through all of the phases. In the clinical high-risk phase, there is usually some degree of social or cognitive deterioration before the onset of psychotic symptoms. These changes may be associated with depression, anxiety, and other behavioral problems, as well as substance use, making the diagnosis of schizophrenia in the early phase difficult. The onset of symptoms may be acute or insidious. Often times, this phase is not appreciated until reflecting back after the emergence of psychotic symptoms. The acute phase is marked by the onset of prominent positive symptoms and a significant deterioration in functioning. It may last several months, depending on the onset of treatment and the response. The recuperative/recovery phase occurs after the remission of acute psychosis, and is usually a several-month period where the patient still experiences significant impairment. Negative symptoms predominate, though some positive symptoms may persist. A number of patients have significant depression. In the residual phase, most patients continue to be somewhat impaired due to the negative symptoms. Though they may improve significantly, they may never return to their premorbid level of cognitive functioning.[11] Some individuals remain chronically symptomatic, despite treatment, and never really enter the residual phase.

Differential Diagnosis

When an individual presents to a medical setting with acute psychosis, etiologies other than psychiatric causes need to be considered. These include medical conditions such as CNS infections, delirium, neoplasms, endocrine disorders, and genetic syndromes, including 22q11.2 deletion syndrome. In addition, multiple drugs of abuse (cannabis, LSD, mushrooms, and dextromethorphan) and prescriptions medications (steroids, anticholinergics, antihistamines, and stimulants) can cause psychotic symptoms. Acute psychosis due to toxic exposure usually resolves in days to weeks, after the offending agent is removed. When drug use occurs before the onset of schizophrenia, it can be difficult to determine whether the psychosis is an independent drug effect, or due to the unmasking of the underlying illness in a vulnerable individual.[12]

There are also multiple psychiatric conditions, other than schizophrenia, that can cause psychotic symptoms. Both bipolar mood disorder and major depressive disorder can present with florid psychosis, including hallucinations and delusions.[13,14] Youth with certain psychiatric disorders, including post-traumatic stress disorder (PTSD), conduct disorder, and/or depression, tend to report high rates of psychotic symptoms.[15] Children who have been abused are particularly likely to report psychotic symptoms, and it is frequently difficult to differentiate trauma-related symptoms from other causes of psychosis.[16] Individu-

als with severe obsessive compulsive disorder and poor insight can also appear psychotic. The majority of children and adolescents who report psychotic symptoms will not go on to be diagnosed with schizophrenia.

Etiology/Pathophysiology

Neuroimaging Studies

Volumetric studies of gray matter in youth at risk for schizophrenia have demonstrated smaller gray matter (GM) volumes in the prefrontal cortex (PFC), superior temporal gyrus (STG), and limbic structures such as hippocampus, anterior cingulate cortex (ACC), and insula.[17] These volume reductions correlate to an increase in symptomatology. PFC change correlates to greater symptom severity and poor executive function. STG change correlates to language deficits, and ACC and insula changes correlate with negative symptoms. The GM loss in schizophrenia with onset in childhood becomes localized to prefrontal and temporal cortices by age 20. Similar patterns of change have been seen in most adult studies, supporting biological continuity between childhood-onset and adult forms of the illness.[18] Recent longitudinal studies of white matter (WM) show integrity changes throughout the course of illness, most prominently in the PFC.[19] Diffusion tensor imaging studies in adolescents and adults with schizophrenia consistently indicate widespread WM abnormalities.[20]

Genetic Studies

Multiple genes and copy number variants (CNVs) have been implicated in the etiopathogenesis of early-onset schizophrenia. 22q11 deletion syndrome is currently the most common identifiable risk factor for schizophrenia.[21] One-third of individuals with this genetic profile develop schizophrenia-like symptoms.[22] The other supported loci associated with schizophrenia are deletions at 1q21, 2p53, 3q29, 15p11.2, 15q11.3, 17q12, and Neurexin 1 (NRXN1),[23-26] and duplications at 7q36.3, 25q11–13, 16p11.2 and 16p13.1.[27,28] Epistatic and epigenetic influences are viewed as key events in the eventual severity/phenotypic expression of the illness. In the *two-hit* model, other factors could include another CNV, a disruptive single-base pair mutation, or an environmental event influencing the phenotype.[29]

Risk and Protective Factors

Genetic vulnerabilities and environmental risk factors likely interact to trigger psychosis in adolescence and young adulthood. Environmental risk factors associated with schizophrenia include living in an urban area, immigration, famine, prenatal and perinatal factors, and advanced paternal age.[30] High family expressed emotion and cannabis use have also been implicated.[31] Preventing or treating perinatal complications (such as hypoxia, infection, and malnutrition), protecting youth from everyday stress or trauma (or treating it with therapy), decreasing expressed emotion in the family environment, and minimizing or preventing cannabis use are all potentially protective.[31] Intervening in the perinatal period with supplements such as choline may affect later expression of schizophrenia in vulnerable individuals.[32]

Prognosis

At the present time, the prognosis for EOS is discouraging. In a recent review, only 15.4 % of individuals with EOS experienced a good outcome, 24.5% experienced a moderate outcome, and 61% experienced a poor outcome.[33] Patients with EOS also show a worse prognosis than patients with other psychotic disorders as a group (schizoaffective, schizophreniform, or bipolar disorder with psychotic features).[34] Poor long-term outcome is predicted by low pre-morbid functioning, insidious onset, higher rates of negative symptoms, childhood onset, and lower intellectual functioning.[34] Suicide is prevalent in youth with schizophrenia spectrum disorders,[35] and they may also be at higher risk for violence.[36] Individuals with schizophrenia have increased medical morbidity in adulthood, including obesity, diabetes, and heart disease.[37]

Assessment

The diagnostic assessment of an individual presenting with psychotic symptoms should include an interview with the patient and family, review of past medical records, and ancillary information (teacher reports, review of substance use, cognitive assessments, and complete developmental and family history).[12] Diagnostic instruments to assess the CHR phase include the Structural Interview for Prodromal Syndromes (SIPS) and a severity measurement, the Scale of Prodromal Symptoms (SOPS).[38-40] These instruments are primarily used in research settings. A structured

diagnostic interview, such as the Kiddie-Schedule for Affective Disorders and Schizophrenia (KSADS), may increase diagnostic accuracy.[41] An accurate diagnosis is vital, as the treatment for schizophrenia can be different from that of other DSM-5 psychotic disorders. Once a diagnosis of schizophrenia is established, the Positive and Negative Syndrome Scale (PANSS) can be used to assess illness severity. Symptoms should be assessed periodically as they may change over time.[12] Comorbid issues like substance abuse and/or cognitive delays should also be assessed, as they may affect the clinical picture and complicate the diagnostic evaluation.[12] As psychotic symptoms are strongly associated with increased risk for suicidal behavior,[42] assessment should also include a screen for suicidality.

Certain laboratory assessments may be indicated, including a complete blood count (CBC), thyroid stimulating hormone level (TSH), a complete metabolic panel (CMP), and a urine toxicology screen. In some cases, amino acid levels, ceruloplasmin level, or porphobilinogen can also be checked. These tests are indicated if non-psychiatric causes of psychosis, such as Wilson's disease or acute porphyria are being considered. If the patient has facial dysmorphism, cognitive impairment, and additional medical comorbidities, a referral to genetics and a chromosomal microarray is indicated. An MRI is only needed if the individual has other neurological symptoms.

Treatment

Clinical High Risk Phase

Initial treatment for individuals designated clinically high risk (CHR) for schizophrenia is psychotherapeutic, with support for various therapy modalities. There is limited evidence that CBT can reduce transition to psychosis, when compared to supportive counseling and monitoring.[43] In a recent study of Family-Focused Treatment (FFT) for CHR adolescents and young adults, there was greater reduction in positive symptoms in the FFT group versus the Enhanced Care (EC) over 6 months. However, only those participants over 20 showed improved psychosocial functioning with FFT versus EC.[44] Psychotherapeutic treatments during the CHR phase are considered clinical guidelines, rather than standard of care, due to the small number of studies supporting their use and the lack of consistent positive findings. One study suggested omega 3 fatty acids may reduce the risk of progression to psychosis in CHR individuals.[45] Atypical antipsychotics are also sometimes used during this period. Because of the risks of side effects, careful observation, monitoring, and psychosocial treatments are preferred.

Acute Phase

Medication Management

Antipsychotics are considered the main choice for treating acute psychotic symptoms and schizophrenia in adult, adolescents, and children. Studies such as CATIE (Clinical Antipsychotic Trials of Intervention Effectiveness), CutLASS (Cost Utility of the Latest Antipsychotic Drugs in Schizophrenia), and EUFEST (European First-Episode Schizophrenia Trial) question the superiority of atypical antipsychotics over typical antipsychotics, and raise concerns about side effects, lack of long-term efficacy, and noncompliance.

The landmark Treatment of Early-Onset Schizophrenia Spectrum Disorders Study (TOESS) is the largest public multi-center trial investigating psychopharmacology for EOS to date. In this study, participants were randomized into 1 of 3 groups with flexible dose ranges: molindone 10-140 mg/day (n=40), olanzapine 2.5-20.0 mg/day (n=35), or risperidone 0.5-6 mg/day (n=41). There were no significant differences in response rates between the 3 groups–molindone 50%, olanzapine 34%, and risperidone 46%.[46] Only 12% of enrollees completed 52 weeks on their originally-randomized treatment, and response tended to plateau after the acute 8-week phase of the trial.[47] Of the 15 subjects who discontinued their medications, 11 stopped due to weight gain. There was an increase in weight in all arms after 8 weeks, but those receiving olanzapine had the highest weight gain, with an average of 6.1kg gained compared to 0.3kg in the molindone group, and 3.6kg in the risperidone group.[46] There were also changes in baseline cholesterol, lipid, glucose, and prolactin profiles. Olanzapine caused the most significant metabolic changes, and risperidone caused a statistically significant increase in prolactin. There were no significant differences in extrapyramidal symptoms. All patients in the molindone group received prophylactic benztropine, whereas those in the olanzapine and risperidone groups did not. Ultimately, TEOSS showed that no agent had high efficacy in treating early-onset schizophrenia, and each agent

had some adverse effects.

Clozapine has shown efficacy above other antipsychotics in treating schizophrenia.[48] Its use is reserved for refractory cases (patients who have failed 2 or more antipsychotic trials) due to its problematic side effects, including agranulocytosis, seizures, and weight gain.[49] There have been several randomized, controlled trials comparing clozapine to both first-generation and second-generation antipsychotics in the pediatric population. Clozapine was found to be more effective than haloperidol for treating both positive and negative symptoms.[50] In 2 comparison, double-blind trials, clozapine was more effective for both negative and positive symptoms.[51,52] A naturalistic follow-up study of patients on medications for 3-11 years demonstrated that clozapine has better clinical improvement, long-term functioning, and tolerability compared to haloperidol, risperidone, and olanzapine.[53] Clozapine initiation requires a slow increase of the medication over time. Monitoring for agranulocytosis requires white blood cell (WBC) and absolute neutrophil (ANC) counts at baseline, and then weekly for at least the first 6 months.[54,55]

Early studies showed efficacy of typical antipsychotics in youth, but were limited by research design and sample sizes. Newer, industry-sponsored randomized controlled trials for youth with schizophrenia have been conducted with atypical antipsychotics. Risperidone showed efficacy with a mean dose of 4.0 mg/day,[56] aripiprazole showed efficacy at 10 mg./day and 30 mg/day,[57] and quetiapine was effective at the 400 mg and 800 mg /day dose.[58] Additionally, a study of flexible dose olanzapine (range 2.5-20.0 mg/day) versus placebo showed improved symptom ratings, but no statistical significance in response rate.[59] Overall, these studies illustrate the effectiveness of atypical antipsychotics over placebo in EOS.[60] Industry-funded studies are underway for asenapine and lurasidone.[61]

Risperidone, aripiprazole, quetiapine, paliperidone, olanzapine, haloperidol, and molindone have FDA approval for the treatment of schizophrenia in youth aged 13 years and older. Molindone is no longer being manufactured. Depot antipsychotic preparations have not been thoroughly studied in the pediatric population.

All antipsychotics have potential adverse effects. First-generation antipsychotics carry a higher risk of neurologic side effects, and second-generation antipsychotics carry a higher risk of weight gain and metabolic side effects. In one study, 272 antipsychotic treatment naïve patients (aged 4-19) with diagnoses of psychosis, mood disorder, and/or disruptive behavior disorder were followed for 12 weeks. Weight gain was a common side effect, with subjects gaining an average of 4.4kg on aripiprazole, 5.3kg on risperidone, 6.1kg on quetiapine, and 8.5kg on olanzapine, compared to similarly diagnosed patients not receiving antipsychotic treatment (average 0.2kg weight gain).[62] This same study showed increased cholesterol and lipid level in those taking olanzapine, quetiapine, and risperidone.

The risk of weight gain, increased body mass index (BMI), and abnormal lipid levels is greatest with olanzapine, followed by clozapine and quetiapine.[62] The risk of neurological side effects is greatest with risperidone, olanzapine, and aripirazole. Neurological side effects are uncommon in children treated with quetiapine and clozapine. There is not enough pediatric data on ziprasidone to draw any conclusions.[63]

Some open-label and small studies indicate metformin as effective in lowering metabolic risk in individuals treated with antipsychotics.[64,65] Extrapyramidal side effects (EPS) can be managed with anticholinergic agents like benztropine or diphenhydramine.[66] Antipsychotics should always be discontinued with the development of neuroleptic malignant syndrome (NMS), and discontinued if possible with tardive dyskinesia (TD).[67,68] If a patient with TD is taking a first-generation antipsychotic, they should be switched to a second-generation antipsychotic.[68] There is no standard treatment for TD once it has developed, though there are reports of benefit from tetrabenazine and clonazepam.[69] Adolescents are at higher risk of developing EPS, with minority males having the highest risk, followed by Caucasian males. Other adverse effects of second-generation antipsychotics include sedation, orthostatic hypotension, sexual dysfunction, hyperprolactinemia (especially with risperidone), prolonged QT interval, and elevated liver transaminases.

In summary, the use of second-generation antipsychotics in schizophrenia is considered standard of care. Risperidone, aripiprazole, and quetiapine are considered first-line agents. Choice of medication should be guided by the known side-effect profile. Clozapine should be considered after 2 failed trials of adequate dose and duration with second-generation antipsychotics. If clozapine is not helpful, or poorly

tolerated, a first-generation antipsychotic such as haloperidol is the next logical treatment choice. Side effects should be treated as necessary. In general, conservative measures, such as lowering the dose or discontinuing the medication, are preferred.

Because of the metabolic side effects, close medical monitoring is needed during treatment with second-generation antipsychotics. Detailed monitoring recommendations are outlined in AACAP's Practice Parameter for the Assessment and Treatment of Children and Adolescents with Schizophrenia,[12] and in guidelines published by the Canadian Alliance for Monitoring Effectiveness and Safety of Antipsychotics in Children (CAMESA).[63] A neurological exam for EPS, dyskinesia, and other neurological side effects should also be done periodically. Assessment scales include the Abnormal Involuntary Movement Scale (AIMS), the Simpson Angus Scale, the Extrapyramidal Symptom Rating Scale, and the Barnes Akathisia Rating Scale. Recommendations for the treatment of neurological side effects can be accessed in the CAMESA guidelines.[68]

Psychosocial Treatments

General interventions that are universally beneficial for treating chronic mental illness in children include psychoeducation for the family. If appropriate, education should include substance use counseling. Education should be delivered in a developmentally-appropriate manner, with a goal of preventing relapse/re-hospitalization, and achieving partnership and treatment compliance. Standard of care also includes milieu therapy during hospitalization, social skills training, and training to improve problem solving skills. Efforts should also be made to enroll patients in specialized educational programs or vocational training, if indicated.[70]

Recent studies have focused on specific cognitive therapies. Specifically, cognitive remediation therapy has been shown as an effective intervention in multiple studies of schizophrenia and psychosis.[71-73] Young adults with schizophrenia/schizoaffective disorder may also benefit from cognitive enhancement therapy, as compared to enhanced supportive therapy, for improving social cognition and neurocognition. Improvements in social functioning were also seen in the cognitive enhancement therapy group after a year of follow up.[74]

Recovery/Residual Phases

For individuals in either the recovery or residual phases of illness, treatment should include ongoing monitoring and support. Participation in therapy, monitoring of medication adherence, and evaluation of medication side effects are all important components of the treatment plan.

Recommendations For Children's Hospital Colorado (CHCO)

Most clinically high-risk (CHR) patients and those with EOS first present to child and adolescent psychiatrists. There is increased interest in identifying and intervening with individuals in the early stages of illness. A dedicated clinic for schizophrenia spectrum and other psychotic disorders would allow for the evaluation and treatment of these individuals by clinicians who have experience with psychotic illness, and have the ability to follow cases over time. Longitudinal follow up is crucial for a number of reasons: (1) there is often diagnostic confusion in the early stages, (2) optimizing medication treatment and stabilizing individuals with psychosis can be a lengthy process, and (3) these individuals are at risk for considerable morbidity. Families and patients benefit from consistent support during the treatment of these challenging illnesses. Protocols should be in place for evidence-based assessment, treatment, and for monitoring and treating adverse effects of medications.

Such a clinic would function as a referral source for patients both within the department and from the community, and could provide consultation to community providers managing patients with a psychotic disorder. Research could also be imbedded in this setting. Ideally, there would be collaboration with the CHCO Maternal Fetal Program and the 22q11.2 Deletion Syndrome Multi-Disciplinary clinic, both of which serve patients who may be at risk for schizophrenia. Continuity with the University of Colorado's Adult Schizophrenia Clinic would ensure that patients are not lost to follow up. The children of adults followed in such clinics could also be referred for screening. Cooperation with community groups that focus on rehabilitation and the development of multi-family support groups would also be helpful.

There are a number of clinics in the United States, and many more worldwide, that serve as models for

the development of a dedicated schizophrenia spectrum and other psychotic disorders clinic at CHCO. The majority evaluate individuals age 12 and up, but certain programs, like CANDI (Child and Adolescent Neurodevelopmental Initiative) at UMass evaluate younger children, including those with bipolar disorder and autism spectrum disorder. Locally, the ADAPT (Adolescent Development and Preventive Treatment) Program at CU Boulder researches individuals between the ages of 12 and 21 who might be at risk for developing a thought disorder. The investigators hope to develop a knowledge base for the prediction of thought disorders, and an understanding of changes in brain function over time in this population. Connecting with one or more of these programs would create opportunities to learn about the challenges and payoffs of such endeavors.

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Assessment and Management of Autism Spectrum Disorder and Intellectual Disability in Children and Adolescents

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Introduction

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental disorder characterized by impairments in social communication and interaction, and the presence of restricted and repetitive interests. Intellectual Disability (ID) is a heterogeneous condition defined by significantly sub-average intellectual and adaptive functioning with onset prior to the age of 18.[1] Not all individuals with ASD have ID (approximately 85% of individuals with ASD have some type of cognitive impairment).[2] The syndrome of autism was first described by child psychiatrist Leo Kanner in 1943, when he detailed a group of 11 children with limitations in their ability to connect with others, but increased sensitivity to non-social aspects of the environment.[3] Over the years, diagnostic criteria for ASD have been refined and the biological underpinnings of the syndrome are better understood. According to the Centers for Disease Control (CDC), the prevalence of an ASD diagnosis based on parent report in individuals aged 6-17 is 1/50.[4] This is a 72% increase from 2010 rate of 1/88.[5] However, the majority of new cases identified had milder symptoms and were diagnosed later in life. There has been a great deal of controversy about the exponential rise in ASD over the past 20 years. The CDC attributes some of the rise to improved diagnostic understanding, better testing methods, and increased awareness. There is also an appreciation that ASD may be the final manifestation of different atypical developmental processes, many of which are poorly understood.[5] Individuals with ASD and/or ID can require high levels of medical, behavioral, and academic interventions, often at a great cost to families and state and federally-funded programs.[6] Yearly health care expenditures for a child with ASD are estimated to be 8-9 times that of a child without ASD. Medication expenses make up approximately 27% of this cost.[7] Because of the enormity of the issue, a basic understanding of ASD and its treatment is crucial to practicing mental health professionals.

Definitions

Prior to the release of DSM-5 in 2013, Pervasive Developmental Disorders was the umbrella category for 5 distinct diagnoses: Autistic Disorder, Asperger's Disorder, Pervasive Developmental Disorder Not Otherwise Specified (PDD NOS), Childhood Disintegrative Disorder, and Rett's Disorder.[8] Individuals who fell within the *autism spectrum* manifested variable symptoms within 3 categories: qualitative impairment in social interaction, qualitative impairment in communication, and restricted repetitive and stereotyped patterns of behavior, interests, and activities. Those with Asperger's Disorder did not have general language delays, and those with PDD NOS had severe and pervasive impairments as described above, but did not meet full diagnostic criteria for Autistic Disorder or Asperger's Disorder. In DSM-5, there is no longer a category called Pervasive Developmental Disorders, and Autistic Disorder, Asperger's Disorder, and PDD NOS have been collapsed into the general diagnosis of Autism Spectrum Disorder (ASD). For a diagnosis of ASD, the individual manifests symptoms within 2 categories: (1) persistent deficits in social communication and social interaction, and (2) restricted, repetitive pat-

terns of behavior, interests, or activities. The diagnosis is further specified as occurring with or without accompanying intellectual impairment, with or without accompanying language impairment, associated with a known medical or genetic condition or environmental factor, associated with another neurodevelopmental, mental, or behavioral disorder, and/or with catatonia. The severity level of the disorder is described by the level of support needed to function. Symptoms must be present within the early developmental period, but may not become apparent until later in life.[1] This differs from the qualifier in DSM-IV-TR: "Delays or abnormal functioning must be present with onset prior to age three years." Childhood Disintegrative Disorder and Rett's Disorder are no longer listed as distinct diagnoses in DSM-5.

According to DSM-5, "Intellectual Disability (ID) is a disorder with onset during the early developmental period that includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains."[1] The severity of the disorder is specified as mild, moderate, severe, or profound, based on the individual's adaptive functioning. In DSM-IV-TR, ID was referred to as Mental Retardation (MR), with the same specifiers, based on the individual's IQ score.[8] The shift from using IQ score to adaptive functioning to describe severity was made because adaptive functioning better predicts the level of supports the individual will require. ID is usually described as a neurodevelopmental disorder, but it can be acquired, as in the case of traumatic brain injury.

Epidemiology

Both ASD and ID have a prevalence rate of about 1% of the population, with approximately 85% of individuals with ASD having some sort of cognitive impairment, and 10% of individuals with ID having ASD. Generally, and in association with ASD, mild ID is the most common type of impairment. Males are more likely than females to be diagnosed with ASD in a ratio of about 4:1. Some studies suggest that males are more likely to be diagnosed with ID, but others are inconclusive.[9] ID is more prevalent in studies based on children/adolescents, compared to adults. Individuals from low and middle income countries are over represented.[9] Girls with ID are more likely to be diagnosed with ASD than those without ID, whereas this is not the case for boys, suggesting that social impairments in girls may be harder to recognize when there is no co-occurring ID, due to better face and affect recognition, emotional expression, and perspective taking.[10]

Risk and Protective Factors

The etiology of ASD is known in only a portion of cases. The syndrome is considered to be neurobiological, as multiple genes have been identified as increasing an individual's risk for ASD. The majority of these genes encode proteins that regulate synapse development and activity-dependent neural responses.[11] There is also evidence that certain neurotransmitter levels, including serotonin and GABA, are altered in ASD.[12] Approximately 30% of individuals with ASD have EEG abnormalities and/or a history of seizures.[13] There are some well-defined genetic syndromes that are associated with ASD, including Tuberous Sclerosis, Fragile X Syndrome, and Prader Willi Syndrome.[14] Some would argue that children with these syndromes do not have ASD, but rather, they have behavioral phenotypes similar to ASD.[14] DSM-5 makes no such distinction; any known associated medical or genetic condition should be recorded with the diagnosis.[1] Defined genetic mutations or syndromes account for about 10%-20% of ASD.[15]

ASD is heritable, with a concordance rate of 60%-90% in monozygotic twins, approximately 10 times higher than the rate in dizygotic twins and siblings. There is a 50 fold increased risk for ASD in first-degree relatives compared to the general population prevalence.[11]

Perinatal and neonatal risk factors associated with ASD include abnormal presentation, umbilical-cord complications, fetal distress, birth injury or trauma, multiple birth, maternal hemorrhage, summer birth, low birth weight, small for gestational age, congenital malformation, low 5-minute Apgar score, feeding difficulties, meconium aspiration, neonatal anemia, ABO or Rh incompatibility, and hyperbilirubinemia.[16] These risk factors can also be associated with ID.[17] Overall fetal health is more important than any one neonatal or perinatal risk factor for the development of ASD or ID.[17]

Prognosis

The presence or absence of ID, language impairment, and/or comorbid psychiatric disorders are the best identified prognostic factors in ASD.[18] ID is generally

considered a lifelong and non-progressive disorder.[19] There are some associated genetic disorders, such as Rett's Disorder, which have a progressive course. Early intensive behavioral interventions (EIBI) have been shown to improve a child's prognosis in ASD.[20] There are a few studies that have followed the course of individuals with ASD over a period of more than 10 years. These studies suggest that about 10% of children will improve dramatically in their mid-teens, but that over 80% of children have symptoms that remain consistent into adulthood.[21] The majority of adults with ASD continue to depend on family or other support services.[22]

Differential Diagnosis

The differential diagnosis of ASD includes other genetic syndromes, ID without ASD, language disorders, learning disorders (diagnosed by demonstrating a gap between an individual's current performance and potential), sensory disorders, Childhood Onset Schizophrenia, and Reactive Attachment Disorder.[1]

Screening and Assessment

Pediatricians and other community health providers are typically the first professionals to be alerted to developmental concerns through parent report or direct observation of a child. The American Academy of Pediatrics recommends that all children undergo screening for ASD as part of their 18- and 24-month well-child visits.[23] Screening instruments typically used in a general medical practice are designed to identify children at risk within an unselected or low risk population (level 1 screeners). Once identified as at-risk, more specific screening tools (level 2 screeners) can be administered. Most of these tools are based upon parent report and are quick to administer, score, and interpret. Screening instruments offer a useful starting point for exploring developmental concerns with further evaluation needed to distinguish between ASD and other developmental disorders or ID.[24] Standardized screening instruments are important to identify children with developmental disorders who are not captured through clinical observation or parent report. Parents' experiences and cultural differences in child rearing practices and developmental expectations contribute to differential patterns of reporting behavioral concerns.[25] Moreover, children may show subtle symptoms of ASD, or seemingly normative development may plateau, decelerate, or even regress.[24]

The *Modified Checklist for Autism in Toddlers* (M-CHAT)[26] is a level 1 screening tool designed for use with children age 16 to 30 months. It has been examined in several empirical studies and shown high sensitivity (reported rates range from 0.75 to 0.98 depending upon the sample) in identifying children who are later diagnosed with ASD, and those who already carry the diagnosis.[25] A two-step approach including a brief standardized follow-up interview helps to reduce false positives.[27] In their review, Norris and LeCavalier[28] found the *Social Communication Questionnaire* (SCQ) to be the most widely researched level 2 screening instrument with multiple studies supporting its diagnostic accuracy. The SCQ appears to be most accurate in identifying ASD among children ages 7 and older, with progressively lower sensitivity rates for younger children. Other instruments, including the *Social Responsiveness Scale* (SRS) and the *Autism Spectrum Screening Questionnaire* (ASSQ) show promise, but have not been widely subjected to independent research.

After children have been identified as possibly having ASD, it is important that they undergo a comprehensive diagnostic evaluation as early in life as possible. An accurate clinical diagnosis is often essential to children obtaining necessary interventions from a variety of systems (schools, mental health agencies, and developmental disability boards). Diagnosing ASD is complicated by the heterogeneous presentation of the disorder, and requires the evaluating clinician to have expertise in typical child development and autism-specific assessment tools. As with any diagnostic assessment of children, autism assessments should include data from multiple informants and methods.

The minimum best practice standard for a comprehensive diagnostic assessment of ASD includes an observational assessment and a parent interview.[29] The Autism Diagnostic Observation Schedule, Second Edition (ADOS-2), is widely considered the gold standard tool for diagnosing ASD.[30] The ADOS-2 uses semi-structured play activities and social interactions to create situational presses for social initiations and responses.[30] Children's behaviors are coded and applied to a diagnostic algorithm, yielding a classification of non-ASD, ASD, or autism, as well as comparison scores for the level of autism-related symptoms.

The Autism Diagnostic Interview, Revised (ADI-R), allows for a detailed exploration of developmental concerns and history of specific symptoms of ASD.[31] It supplements the ADOS-2 observational assessment by providing important information about the child's presentation over time and across multiple contexts. The combination of both tools has been shown to be superior to a single measure in correctly classifying children with ASD.[32]

Other tools may be necessary to clarify the diagnostic picture, especially when observational data and parent report are discrepant. Comprehensive measures of cognitive ability are important to rule out comorbid ID and identify specific impairments that may relate to observed delays. Several standardized, norm-referenced measures are available for use with verbal children (Wechsler Intelligence Scale for Children, Fourth Edition; Stanford-Binet, Fifth Edition; Mullen Scales of Early Learning) and non-verbal children (Leiter-R; Comprehensive Test of Nonverbal Intelligence).[33] Standardized measures of adaptive functioning (Vineland-II; Scales of Adaptive Behavior, Second Edition), speech and language, motor skills, and sensory-related issues also help to understand an ASD child's unique needs and tailor appropriate interventions.[33]

Available diagnostic tools for autism have not been well validated with culturally and linguistically diverse samples. As a result, it is possible that children in these groups are misidentified or under-identified compared to Caucasian samples.[34] It is critical for clinicians to take into account cultural and language factors that may affect children's presentations and parents' reports within the diagnostic evaluation process. Similar concerns exist regarding gender differences. Males are disproportionately represented in ASD research, including samples used to develop and validate common screening and assessment tools. As a result, gender differences in the expression of ASD may not be well-captured by current diagnostic schemes, and identified females may represent a more severe end of the spectrum, often with comorbid intellectual difficulties or other complicating organic conditions.[35]

Children presenting with developmental disabilities also need a thorough medical examination and work-up. This may include consultation with Genetics and/or Neurology. Depending on the presence of significant behavioral symptoms, individuals with ID may be more likely to present to a pediatric practice than a psychiatry practice. Etiologies of ID, including genetic syndromes and in-born errors of metabolism, have often already been screened for by the time an individual presents for a mental health assessment.[23] Ideally, individuals diagnosed with ASD in the absence of ID should also be screened for the presence of chromosomal abnormalities with a microarray (to identify single nucleotide polymorphisms and copy number variants which may be associated with ASD). However, checking a chromosomal microarray is not yet considered standard of care and is not always covered by insurance companies.[36]

Comorbid Conditions

Given the wide range of developmental impairment, including the frequent presence of ID,[37] the treatment of pediatric patients diagnosed with ASD requires the participation of multiple disciplines, including speech and language, occupational therapy, psychology, behavioral therapy, and social work. Common comorbidities include psychiatric diagnoses,[38] medical diagnoses that may initially present with behavioral escalations (dental problems, constipation), and genetic conditions. Ideally, psychiatric and pediatric practitioners should work together in the care of children and adolescents with ASD. Involving multiple disciplines makes it possible to look beyond the "tip of the iceberg" presenting symptoms (usually externalizing behavioral symptoms), to the many possible underlying contributing factors.[37] With the help of the discerning eye of each discipline, the most prominent underlying factors can be identified, leading eventually to specific diagnoses that can be addressed.

Individuals with developmental disability, whether ASD, ID, or a combination of both, are at greater risk than the general population of having a comorbid psychiatric diagnosis. Seventy percent of children with ASD have at least 1 psychiatric comorbidity, and 40% of children with ASD have 2 or more comorbid diagnoses.[39] One of the major concerns in psychiatric and developmental disabilities literature is that of *diagnostic overshadowing*. The term diagnostic overshadowing was first used in 1982 to refer to the tendency for clinicians to attribute symptoms or behavior of a person with ID to their underlying cognitive deficits and hence to under diagnose the presence of comor-

bid psychopathology.[40] Despite the recognition of diagnostic overshadowing within the medical literature, there is still some disagreement as to whether common presenting behavioral difficulties in individuals with developmental disability (DD) should qualify as part of the DD itself, or as a disorder in addition to DD.[37] However, the frequent presence of behavioral, mood, and anxiety difficulties in patients with DD is clear. All categories of psychiatric illness can present in an individual with ASD or ID, with mood and anxiety disorders being the most common, and substance abuse disorders being the least common.[38] DSM-5 now allows for the diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) in an individual with ASD, but a diagnosis of Reactive Attachment Disorder (RAD) still precludes a diagnosis of ASD. Presenting psychiatric symptoms can be similar to those in the neurotypical population, but there are some differences. For example, an individual with Major Depressive Disorder and Moderate ID is unlikely to report feeling guilt, as he or she may not even be aware of the concept of guilt.[41] The Diagnostic Manual-Intellectual Disability (DM-ID) was developed by the National Alliance of the Dually Diagnosed (NADD) to help mental health practitioners working with the developmentally disabled be more attuned to recognizing the manifestations of common psychiatric conditions.[41] Diagnosing a psychiatric disorder in a child with a developmental disability also requires an understanding of the child's baseline level of functioning. Changes in appetite, sleep, mood, behavioral issues, self-injury, and ability to perform activities of daily living can all signal the possibility of a comorbid psychiatric disorder.

Comorbid medical conditions in ASD must also be considered. Because many individuals with ASD and ID have communication impairments, making diagnoses can be difficult. Gastrointestinal issues and sleep problems are 2 commonly associated conditions.[42] In an effort to further international collaboration, the Autism Treatment Network (ATN) was developed. The ATN is a network of hospitals, physicians, researchers, and families across 17 sites in the United States and Canada. The goal of the ATN is for treatment providers to share information in order to develop a set of clinical guidelines for the management of various concerns in ASD. Guidelines and information are also put together in a series of "toolkits" accessible to parents and families on the Autism Speaks website. Children's Hospital Colorado is a member of the Autism Treatment Network with providers in Developmental Pediatrics, Psychiatry & Behavioral Sciences, Occupational Therapy, and Speech Language Pathology.[42]

Medical Interventions

Psychopharmacological treatment of ASD and ID is based on the presenting symptoms and comorbid psychiatric diagnosis. Medication treatment should always be a part of a comprehensive treatment plan that includes behavioral and educational interventions, and should be focused on specific targets.[43] Approximately 45% of children with ASD are prescribed psychotropic medication.[44] Even if a formal psychiatric diagnosis is not made, the range of serious symptoms including agitation, aggression, and self-injury will necessitate psychiatric evaluation and management. The child and adolescent psychiatrist is called upon to (1) search for medical causation of the behavioral and mood symptoms, refer the patient to pediatrics as appropriate, and help coordinate needed medical treatments; and (2) to perform psychiatric medication evaluations, prescription, and management in relation to the presenting symptoms. The psychiatrist is just one member of a multidisciplinary team, and it is the responsibility of the psychiatrist to work closely with other disciplines, as well as the family, in the care of the child.

Despite the growing number of randomized controlled trials over recent decades, there are several factors that stand in the way of advancing therapeutic practices for children with ASD and ID.[45] These factors include the lack of an accepted diagnostic system for comorbid psychiatric illness, controversy as to whether to study comorbid psychiatric diagnoses or to study symptom clusters (for example, aggression and self-injury), controversy as to whether behavioral clusters found in patients with ASD correlate with behaviors and symptoms in a neurotypical population, the lack of widely used and agreed upon outcome measures for patients with ASD, and a relative focus on patented prescription medications to the exclusion of other agents. There is no medication that has shown efficacy for treating the core symptoms of ASD (social and communication impairment, and restricted and repetitive interests). Risperidone and aripiprazole are the only drugs that have Food and Drug Administration approval for the treatment of severe irritability and aggression associated with ASD.[46]

Risperidone has been the most extensively investigated drug for treatment of severe irritability in ASD, including an 8-week, multi-site, double-blind, placebo-controlled study of mean daily dosage 1.8 mg. Risperidone treatment led to a 57% decrease on the Aberrant Behavior Checklist (ABC) Irritability subscale score versus a 14% decrease with placebo.[47] A prolonged extension phase of the study continued to show efficacy of risperidone as compared to placebo, though significant weight gain was a side effect. Overall, 69% had a positive response on risperidone versus 12% positive response on placebo. There were also significant positive findings for hyperactivity and stereotypy.[46]

Aripiprazole, targeting irritability as measured by the ABC, resulted in a 56% positive response (TDD 5 mg aripiprazole) versus 35% with placebo. There was significant improvement in irritability, hyperactivity, and stereotypy subscales. Side effects, as for risperidone, included weight gain, fatigue, and/or drooling.[48]

Other classes of medication, including SSRIs, stimulants, alpha agonists, and mood stabilizers are frequently used for treatment of behavioral problems in children with DD; however, there have been few randomized placebo-controlled drug studies supporting their use.[49] Anxiety disorders are the most common psychiatric comorbidity in children with ASD, yet there have been no controlled trials of pharmacologic treatment of anxiety in the population. The studies that do exist are small and uncontrolled. In 2009, a randomized placebo-controlled trial of citalopram targeting repetitive behavior in 145 children with ASD (ages 5-17) showed no significant improvement. Compared to individuals treated with placebo, individuals treated with citalopram had increased energy, impulsivity, decreased concentration, increased hyperactivity, and increased stereotypy.[50] There is some evidence that treatment of ADHD symptoms with methylphenidate is beneficial. However, treatment effects are less robust than those seen in neurotypical children, and children with ASD are more likely to experience side effects.[51]

Sleep disturbance is common in individuals with ASD, and melatonin is frequently the treatment of choice. There is some evidence supporting its use, but similar to other medications, there are few randomized controlled trials or long-term follow up data.[52]

Behavioral Interventions

Focused intervention practices (FIPs) target specific skills or symptoms. Many FIPs are components of the more comprehensive treatment models; however, they are also delivered as stand-alone interventions and have been studied for their effectiveness in treating core ASD symptoms (social or communication impairments, and restricted and repetitive interests). Several interventions commonly used to build social skills and communication among children with ASD have empirical support. Applied behavior analysis (ABA) strategies, such as prompting, reinforcement, and discrete trial training, have demonstrated effectiveness in teaching specific skills (for example, eye contact, greeting, and communication) through structured sequences of stimulus-behavior-reward.[53] These interventions are often delivered in a highly-controlled clinical setting, potentially leading to problems with generalizing skills to more naturalistic or novel settings.[53]

Naturalistic behavioral interventions (incidental teaching, milieu teaching, and pivotal response training) incorporate motivational components to improve a child's responsiveness across settings and within more natural interactions. Components of naturalistic interventions with demonstrated effectiveness include task variability, maintenance tasks, immediate and natural consequences, and providing choice of stimulus materials and topics.[54] Training peers and parents to provide teaching opportunities and reinforce target behaviors has also shown promise in building social and communication skills.[55] For children with limited expressive communication skills, Augmentative and Alternative Communication (AAC) systems use technology (voice output devices) and other materials (symbols, pictures, and visual schedules) to enhance receptive and expressive vocabulary. For example, children with ASD and communication impairments have shown success in using the Picture Exchange Communication System (PECS) as a communication tool, although research on the generalization of skills outside of the training environment is limited.[56]

Functional behavior analysis (FBA) is a common technique for evaluating, and then reducing, problem behaviors in children with ASD. This process involves the observation and manipulation of the antecedents and consequences of behaviors to identify which factors are causal. Once identified, antecedent-behavior-

consequence chains can be altered to reduce problem behaviors.[57] Problem behaviors may also be due to a lack of understanding of a complex or difficult situation. Social stories use words and pictures to explain appropriate behaviors in particular situations.[58] These stories are often highly personalized in order to increase a child's motivation and interest in the material. With frequent repetition, social stories may help replace negative behaviors with more appropriate alternatives.[59] Research on interventions specifically for restricted repetitive behaviors (RRBs) is limited. Again, behavioral strategies that involve disrupting the relationship between the behavior and reinforcement, modifying the environment to reduce potential triggers of the behavior, and teaching adaptive skills that may replace or result in collateral reductions in RRBs are the most commonly investigated approaches.[60]

Comprehensive treatment models (CTMs) for ASD target a wide range of developmental outcomes and skills within a conceptually organized treatment package.[61] Early Intensive Behavioral Interventions (EIBI), based on the principles of operant conditioning and ABA[62], are among the first and most widely-researched treatments for children with ASD. EIBI typically involves frequent (over 40 hours per week), long-term (2 or more years), and home-based behavioral therapy. Parents receive extensive training in the application of behavioral strategies to provide consistent and continuous intervention throughout the child's day. The existing research on EIBI has shown positive gains in IQ scores, language, adaptive behaviors, and educational attainment[62,63] with more positive outcomes predicted by earlier initiation of interventions and high levels of training and credentials of clinical supervisors.[64]

The Early Start Denver Model (ESDM)[65] is a behaviorally-based intervention for children between the ages of 12 and 48-months-old. It can be delivered in a clinic or home setting, utilizing individual and group modalities, with a high degree of parent involvement. Interventions follow a developmental sequence and use ABA principles combined with interpersonal interactions, joint activity, and positive affect. A randomized controlled trial of EDSM found significant gains in IQ, language, and adaptive behaviors among children who received 15 to 20 hours per week of the intervention over a 2-year period compared to other community-based treatments for ASD.[66] Consistent with the research on EIBI, treatment gains were greater among children who were enrolled at an earlier age and received more intensive services.[66] When parent-delivered ESDM, consisting of up to 12 weekly hour-long sessions, was compared with community treatment as usual, no differences were found on the primary outcome measures of development, cognition, and behavior.[67] Comprehensive, behaviorally-based interventions for young children, such as Lovaas-based EIBI and ESDM, show promise in improving outcomes for children with ASD; however, there have been very few randomized controlled trials, and existing studies are limited by small sample sizes and a lack of random assignment, fidelity data, and standardized comparison or control groups.[68,63]

Another CTM used with individuals with ASD across the lifespan is the Treatment and Education of Autistic and Communication Handicapped Children (TEACCH) program. This model uses structured teaching methods that are sensitive to the unique visual learning styles associated with ASD, especially relative strengths in visual processing and attention to visual details.[69] These methods include structuring the physical environment (furniture arrangement and visual labeling) to provide meaningful information to the individual; using a schedule to communicate a sequence of events; and visually organizing tasks to show what is to be done, the length of the task, progress, when it is finished, and what will happen next. TEACCH methods have been shown to be effective in improving parental skills and behaviors of children with ASD.[70] Visual structures, such as independent work systems, have been shown to increase task accuracy and reduce the need for adult support among students in special and general education settings.[71]

Conclusion and Future Directions

Children's Hospital Colorado currently offers fragmented services for children with developmental disabilities. Many of these children are first evaluated through the Child Development Unit or JFK Partners, and some of them receive their primary care services through the Special Care Clinic (within the Division of Developmental Pediatrics). However, there is limited help for routine psychiatric medication management and therapy. The Neuropsychiatric Special Care unit has demonstrated remarkable achievement in positively changing the lives of many patients,[72] and

offers vital comprehensive inpatient and day treatment levels of care for those individuals in psychiatric crisis. However, once children are ready to discharge back into the community, families have a difficult time finding outpatient providers willing and capable of managing their child's needs. Appropriate care for a child with a developmental disability requires a multidisciplinary approach. Psychiatry, Developmental Pediatrics, Psychology, Social Work, Physical Therapy, Speech Language Pathology, and Occupational Therapy all have valuable insights to offer to a child's treatment. The creation of an outpatient clinic capable of coordinating services under one roof would be a huge asset for the treatment of children with ASD and ID in the state of Colorado.

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Adolescent Substance Use Disorder Prevention and Treatment

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Introduction

Substance abuse problems represent a significant public mental health issue for adolescents in the United States, with 23% of youth having developed a substance use disorder by the age of 18.[1] Childhood mental health problems increase the overall risk for developing adolescent-onset substance use disorders. Conversely, adolescent substance misuse increases the risk of developing co-occurring mental health problems, and the co-occurrence mental health and substance use problems complicates clinical management and treatment. Fortunately, there are a number of practical and effective approaches to the prevention and treatment of adolescent substance abuse problems and their co-occurrence with mental health problems that could—and should—be included in the deployment of comprehensive child and adolescent behavioral health services.

Epidemiology

There is rich literature regarding the epidemiology of substance use problems among adolescents. One of the most recent rigorous efforts is the *National Comorbidity Replication–Adolescent Supplement* (NCS-A), which examined the prevalence of behavioral health problems and related service utilization among a nationally representative sample of adolescents ages 13-18 years.[1,2-4] Consistent with other studies in this area, the vast majority of adolescents report that they had consumed alcohol by age 18 (78.2%), with about a quarter having used drugs by age 18 (24.4%). Alcohol and drug use was rarely initiated prior to age 13, but accelerated rapidly throughout adolescence. Substance use disorders showed a similar, but slightly lagged pattern with acceleration in diagnostic rates starting after age 14. The lifetime prevalence of alcohol use and drug use disorders by age 18 was 6.4% and 8.9%, respectively. Alcohol and drug use disorders were somewhat more common in males than females (7.0% vs. 5.8% and 9.8% vs. 8.0%, respectively).

Equally striking are the high rates of comorbidity among substance use disorders with other psychiatric diagnoses. In the NCS-A, 60% of youth with an alcohol use disorder had a comorbid drug use disorder, and 44% of those with a drug use disorder had an alcohol use disorder. Thirty-two percent of adolescents with a substance use disorder met criteria for a non-substance use psychiatric disorder. Particularly concerning is the relationship of substance use disorders with suicidal behaviors, with 24% and 35% of adolescents who attempted suicide meeting criteria for an alcohol or a drug use disorder, respectively. Armstrong and Costello[5] examined the rates of comorbidity between substance use disorders and other mental disorders reported in 15 epidemiological studies. Compared to adolescents without substance use problems, only 2 classes of disorders were clearly more common among adolescents with substance use problems: Disruptive Behavior Disorders (mainly Conduct Disorder with rates of 25.0% to 50.0%) followed by Major Depressive Disorder (with rates of 20.0% to 30.0%). Rates of other mental disorders that were prevalent among adolescents with substance use disorders included Anxiety Disorders (7% to 44%), Attention Deficit Hyperactivity Disorder (12%), Post-traumatic Stress Disorder (11%), and Eating Disorders (5%).

The rates of comorbidity are higher in treatment settings. For example, Aarons et al.[6] found that 40.8%

of youth receiving treatment in public mental health settings met criteria for a substance use disorder.[6]

There is rich literature on the risk and protective factors for substance use disorders. Genetic factors are estimated to account for 40%-70% of risk for developing substance use problems (the magnitude of this association varies across substances).[7] Key psychological and social risk factors include sensation seeking, antisocial behavior, peer and parental substance use (and attitudes towards substance use), as well as community norms regarding substance use (eg, rates of adult alcohol use and adult drunk driving are associated with adolescent substance use).[8] Mental disorders, particularly Conduct Disorder, increased the risk of substance use disorders.[5] Protective factors include social skills, engagement in recreational activities, having a non-parental adult role model, and religious involvement.[8] It is also notable that substance use disorders, especially during adolescence, are associated with a greater risk of developing mental health problems.[9,10] For example, cannabis use increases odds of psychosis by 1.41; frequent cannabis use by 2.09.[10]

Disparities in the rates of substance use disorders are also well documented. In the NCS-A, non-Hispanic blacks had lower rates of substance use disorders than whites and Hispanics.[1] Studies of American Indian adolescents suggest that they have higher rates of substance use problems than non-native youth.[11]

In Colorado, the growth of the medical marijuana industry and the legalization of recreational marijuana for adults over 21 is already having impacts on adolescent substance use. There is strong evidence for the diversion of medical marijuana to adolescents.[12,13] There are also concerns that the shift in attitudes towards marijuana use indicative of its medicalization and legalization will result in greater adolescent misuse and related problems, though a recent survey suggests that while a majority of parents of adolescents in Colorado are supportive of the decriminalization of marijuana use for adults, they want strict controls of its distribution and use because of concerns regarding its health impacts on youth.[14]

Finally, despite the long-standing recognition of adolescent substance use as a significant public health problem, access to care remains severely limited. In the NCS-A, only 15.4% of adolescents with substance use disorders received substance abuse services.[2]

Prevention

There are 3 types of prevention programs cited in the literature related to substance misuse among adolescents. *Universal prevention* refers to intervention aimed at targeting the entire population, *selective prevention* targets subgroups within the population who are considered high risk (eg, individuals with a genetic predisposition), and *indicated prevention* describes interventions that are geared toward those who are already exhibiting early signs of substance use problems, engaging in substance misuse, or other high risk behaviors.[15]

Cochrane reviews of various types of prevention programs have described the evidence as being relatively weak with heterogeneous and modest initial effect sizes that diminish over time. Universal prevention programs that are designed to target youth who have not yet initiated substance use typically have limited effectiveness.[16,17]

The most effective drug prevention approaches focus on reducing risk factors and increasing protective factors.[15,18] Additionally, multi-modal universal prevention programs that utilize developmentally tailored *booster* sessions tend to show more robust, longer-term effects.[19] For school-based interventions, there is some evidence that prevention programs using non-teacher facilitators (eg, mental health counselors, peer leaders, and health professionals) or a combination of teachers and other facilitators are more effective than teacher-led interventions alone, although these results are somewhat inconsistent.[19]

A recent Cochrane review of universal school-based intervention programs, published in 2011, identified 3 programs deemed to be most effective: (1) the Life Skills Training Program, (2) the Unplugged Program, and (3) the Good Behavior Game.[20]

The Life Skills Training program utilizes a cognitive behavioral skills framework with goals of improving self-esteem, assertiveness, drug resistance, problem solving, communication, emotion regulation, and social skills. The program provides education about negative consequences of drugs and alcohol. This program is intended to be delivered starting in the seventh grade, with booster sessions in subsequent years (10 sessions in eighth grade, and 5 in ninth grade). Findings related to the Life Skills Training program showed lower rates of substance use than controls.[21,15]

The Unplugged Program is based on a social influence model and focuses on teaching life skills, such as assertiveness, problems solving, coping, effective communication, and self-control. It also incorporates education regarding risk and protective factors. It is delivered using 12 sessions.[17,22]

The Good Behavior Game focuses on behavioral management with the intention of promoting an understanding of the child's role within the classroom community. It is delivered to first and second grade children.[23] A study examining the long-term effects of this intervention found that those who received the Good Behavior Game intervention had lower rates of problematic behaviors such as substance use disorders, antisocial behaviors, and suicidal ideation in young adulthood.[23]

A recent, comprehensive, systematic review of selective prevention programs indicates that while there are some programs that show promising results, due to the limited number of studies, current findings are considered preliminary.[24]

Indicated prevention programs that have shown promising efficacy are school-based, and focus on serving youth who have already initiated a mild to moderate level of substance use. Winters[25] and Walker[26] describe very brief interventions consisting of 2 to 3 individual sessions of Motivational Enhancement Therapy (MET)/Motivational Interviewing compared to an Educational Feedback Control (EFC). These very brief interventions show modest short-term reductions in self-reported cannabis use, primarily in adolescents who elected to participate in as many as 4 additional (and optional) Cognitive Behavioral Therapy (CBT) sessions after completing the brief MET intervention. This suggests that longer school-based MET/CBT interventions are needed for the growing number of high school students who regularly use (approximately 25%), or the estimated 10%-15% who meet diagnostic criteria for Substance Use Disorders (SUD). Results from a recently completed pilot study provide empirical support for this conjecture.[27] The study adapted an existing 16-week evidence-based MET/CBT + CM intervention (*Encompass*) as a briefer (8-week) school-based intervention. Fifteen students who committed drug/alcohol related school offences were consecutively referred for clinical evaluation. All met DSM-5 diagnostic criteria for cannabis use disorder, and 13/15 enrolled in the 8-session intervention after adolescent/parent consent. Nine (69%) completed treatment with 95% compliance (CBT session attendance), and more than half (56%) achieved at least 1 month of sustained abstinence during treatment based on weekly urine drug screens.[27]

Screening And Assessment

There are 2 types of assessments for substance use and abuse in adolescents that are widely used: brief screening, and comprehensive evaluation. Brief screening is used with the intention of identifying whether there is a cause for concern, and determines if there is a need for further evaluation. Brief screening can be completed in a very short period of time (typically within minutes), and should be a part of any clinical intake process. Comprehensive evaluation tools are utilized when a potential substance use problem has already been identified. These types of evaluations can take up to 2 to 3 hours, depending on the structure of the particular evaluation. The goal of these more comprehensive assessments is to gain a clearer understanding of the nature and severity of the substance problem. They may also gather relevant biopsychosocial information, establishing an appropriate diagnosis, determining the presence of comorbidities, and providing a framework for treatment planning.[18,28,29] There are several commonly-used instruments to accomplish the above tasks,[30,31,28] which are summarized in Table 1. Review articles regarding screening and assessment should be reviewed for more detailed descriptions and evaluations of the instruments, as well as a discussion regarding their utility, reliability, and validity information.[30-32]

Screening & Brief Assessment	Comprehensive Evaluation
• CRAFFT–This is a brief 6-item screening tool • Substance Abuse Screening Inventory-Adolescent Version • Personal Experience Screening Questionnaire: PESQ: • Drug Use Screening Inventory (DUSI-A) • Adolescent Drinking Index (ADI) • Adolescent Drug Involvement Scale (ADIS) • Drug Abuse Screening Test-10 (SBIRT)–This is a 10-item instrument that should take less than 8 minutes to complete. It can be used with adults or older youth.	• Adolescent Diagnostic Interview (ADI) • Adolescent Drug Abuse Diagnosis (ADAD) • Adolescent Drug Involvement Scale (ADIS) • Adolescent Alcohol and Drug Involvement Scale (AADIS) • Personal Experience Inventory (PEI) • Kiddie Schedule for Affective Disorders and Schizophrenia (KSADS)-comprehensive semi-structured diagnostic interview

Table 1. Commonly-Used Measures for Screening and Comprehensive Assessment of Substance Use Problems.

Evidence-Based Interventions For Adolescents With Substance Use Disorders (SUD)

Evidence-Based Psychosocial/Behavioral Treatments for Substance Abusing Adolescents

According to recent published reviews, the following psychosocial interventions are considered to have "well-established efficacy:" (1) Individual Cognitive Behavioral Therapy (CBT) with or without a component of Motivational Enhancement Therapy (MET), (2) Multidimensional Family therapy (MDFT), (3) Functional Family Therapy (FFT), and (4) Cognitive Behavioral Therapy-Group (CBT-G).[33,34] Interventions deemed to be "probably efficacious" include: (1) Brief Strategic Family Therapy (BSFT), (2) Behavioral Family Therapy (BFT), and (3) Multi-Systemic Therapy (MST).[34] Taken together, these interventions have comparable and moderate acute treatment effect sizes on reductions in substance, and more modest effects on sustained abstinence.[33-35] Of those listed above, interventions that utilize individual MET/CBT have consistently shown greater sustained or emerging post-treatment effect size compared to family-based interventions.[33-35] Other studies have shown that contingency management (CM) using motivational incentives (ie, voucher payments or prize drawings) significantly increase rates of sustained abstinence, when added to individual MET/CBT compared to MET/CBT alone.[36,37] In a randomized controlled trial of CM in 69 adolescents (ages 14-18) with cannabis use disorders, 50% of the participants who receive CM+MET/CBT achieved at least 10 weeks of abstinence compared to 18% who received MET/CBT alone. In this study, between group differences were maintained at 6 months, but not the 9-month post-treatment follow up.[38]

Medication-Assisted Treatment for Adolescents with SUD

Numerous studies in adults have shown that medications can be useful when used in conjunction with psychosocial or behavioral interventions for addiction to alleviate symptoms of withdrawal, reduce craving and use, prevent relapse, or to treat common co-occurring psychiatric conditions such as depression or anxiety disorders.[39] Unfortunately, relatively few randomized controlled medication trials have been conducted in adolescents or young adults compared to adults with substance use disorders. Medications that are efficacious or probably efficacious, and which have relatively good safety profiles in adolescents with SUD are shown in Table 2.

Medication	Targeted SUD or Psychiatric Comorbidity	Reduce Craving	Agonist Replacement Therapy	Psychiatric Comorbidity
N-Acetylcysteine (NAC)	Cannabis Use Disorder	X		
Buprenorphine	Opiate Dependence		X	
Nicotine Replacement Therapy	Nicotine Dependence	X	X	
Bupropion	Nicotine Dependence	X		X* *(ADHD, MDD)
Fluoxetine	Major Depressive Disorder (MDD)			X
Osmotic-Release Methylphenidate (OROS-MPH)	ADHD			X
Atomoxetine	ADHD			X

Table 2. Medications for Adolescents with Substance Use Disorders.

Medications for Cannabis Use Disorders. N-acetylcysteine (NAC) is widely available as an over-the-counter antioxidant supplement or *neutriceutical*. An 8-week, randomized, double-blinded, placebo-controlled trial evaluated the impact of N-acetylcysteine (NAC) (1200 mg twice daily) compared to matching placebo on cannabis use and craving in 116 cannabis-dependent adolescents/young adults (ages 15-21) in the context of brief weekly cessation counseling and contingency management. Participants who received NAC were 2.4 times more likely to have a negative urine cannabinoid test (THC) at post-treatment follow-up visit, and had significantly more negative urine drug tests during treatment compared to those who received placebo (19% vs 10%, respectively).[40]

Medications for Opiate Use Disorders. In opiate-dependent adolescents (ages 15-21), longer term (12-week) treatment with buprenorphine-naloxone has been shown to be more effective than brief 14-day buprenorphine-naloxone taper (detoxification) with regard to: (1) treatment compliance, (2) fewer opiate positive urine drug screens, (3) less self-reported opiate use.[41]

Medications for Smoking Cessation. Although findings are somewhat mixed, and effect sizes and cessation rates tend to be somewhat lower than that reported in adult studies, both Nicotine Replacement Therapy (NRT) and Bupropion-SR have been shown to be relatively safe and more effective than smoking cessation counseling alone in nicotine-dependent adolescents.[42,43-45]

Medications for Co-occurring Psychiatric Disorders

Major Depressive Disorder. Fluoxetine has been shown to be more effective than placebo for co-occurring depression in adolescents concurrently participating in outpatient substance treatment with individual MET/CBT.[39] Despite non-abstinence in most participants, fluoxetine was also well-tolerated, and demonstrated a good safety profile.

Attention-Deficit Hyperactivity Disorder

Both Osmotic-Release Methylphenidate[46] and atomoxetine[47] have been shown to be relatively safe and probably efficacious for co-occurring ADHD in adolescents concurrently receiving outpatient substance treatment with individual MET/CBT.

Summary And Recommendations For Clinical Practice

Research in the past decade has increased our understanding of biological and developmental processes, as well as environmental risk factors that contribute to adolescent-onset substance use disorders (SUD). There has also been significant progress in the development, implementation, and dissemination of psychosocial interventions that have been deemed to be efficacious or probably efficacious for adolescent SUD.

A handful of medications have also been shown to be useful for reducing withdrawal symptoms, drug craving, and co-occurring psychiatric disorders. Despite significant progress, existing behavioral interventions for adolescent SUD show relatively modest reductions in drug use that attenuate over time, low rates of abstinence, and high relapse rates. Although additional research is needed to improve existing interventions or develop more effective interventions, many treatment programs could currently improve abstinence rates by incorporating CM/motivational incentives into existing treatment. Unfortunately few community-based treatment programs currently utilize CM/incentives. Treatment could also be improved by implementing standardized clinical assessments and repeated measures to enable treatment programs to more rigorously evaluate clinical outcomes and inform practice improvement. De-identified data from clinical assessments could also be used to develop competitive grant proposals to further advance research and clinical practice.

The most significant limitation of the treatment system are the considerable barriers to treatment access, including the limited availability of adolescent-focused substance abuse services. To our knowledge, there is no other area of medicine for which the gap between treatment need and availability is as great as it is for adolescents with substance use disorders (SUD). Existing community-based adolescent substance treatment programs predominantly serve youth who are referred by the juvenile justice system, in part, because the juvenile justice system is the largest third-party payer for adolescent drug treatment, nationwide. Such youth represent less than 10% of those who could benefit from substance treatment. Very few treatment options exist for the estimated 11% of adolescents in the U.S., the majority of whom are high school students, who meet criteria for substance use disorders, but who are not (yet) involved with the juvenile justice system. The vast majority of existing school-based drug prevention programs are designed for youth who have not yet initiated substance use. School-based interventions for youth who have progressed to problematic use, abuse, and/or dependence are very brief, utilizing 1-3 session motivational enhancement interventions that have shown modest to weak short-term reductions in substance use that attenuate over time.

It is possible that the effectiveness of evidence-based substance psychosocial treatment interventions located in community-based treatment settings could be improved if adapted as school-based interventions for non-juvenile-justice-involved high school students who may have somewhat less serious substance involvement. This would be aligned with The American Academy of Pediatrics and the President's New Freedom Commission on Mental Health (NFC) recommendations that mental health and substance treatment services be extended to non-traditional treatment settings, especially schools, to address critical gaps in access and availability of high quality behavioral health treatment for youth and families. This would also help address existing disparities in access for socioeconomically disadvantaged and racial/ethnic minorities, and facilitate greater continuity and coordination with primary medical care in many existing school-based health clinics.

Efforts to significantly increase access and the availability of substance or integrated behavioral health treatment will also require significant expansion of the workforce. Clinical training programs will need to be significantly enhanced and transformed to address the critical shortage of clinicians with dual training in mental health and addiction prevention and treatment, as identified by the Institute of Medicine. University-based research and clinical training programs may be in the best position to take the lead in developing enhanced clinical training programs, and establishing clinical competency and credentialing criteria. Mental health clinician training should include (1) training in systematic assessment of biological/developmental processes, environmental risk, and protective factors associated with adolescent-onset substance abuse; (2) training in evidence-based prevention and treatment interventions that have been shown to reduce risk and enhance resilience or protective factors (eg, Parent Management Training for children with ODD/CD); (3) training in evidence-based approaches to integrated or coordinated treatment (eg, co-located mental health/addiction treatment services); and (4) training in continuing care (eg, relapse prevention, recovery support services) and coordinated care models for youth with co-occurring substance abuse and mental health problems.

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Eating Disorders in Children and Adolescents

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Introduction

Feeding and eating disorders are characterized by a persistent disturbance of eating or eating-related behaviors that result in altered consumption or absorption of food significantly impairing physical or psychosocial functioning.[1] The typical eating disorders (EDs) have been anorexia nervosa (AN) and bulimia nervosa (BN). In the most recent Diagnostic and Statistical Manual of Mental Disorders (DSM-5[1]) a new disorder, binge eating disorder (BED), has been included. Individuals with EDs that do not meet full criteria for AN, BN, or BED are now described in the *Other Specified Feeding or Eating Disorder* and *Unspecified Feeding and Eating Disorder* categories. EDs are severe psychiatric disorders with about 1.5 times the mortality rates for all causes, and between 4 and 6 times the standardized mortality rates for suicide. EDs are highly associated with anxiety and mood disorders; they often take a chronic course and cause significant negative economic impact.[3-5] Our knowledge about the underlying neurobiology is limited, as are treatment options for AN, BN, and BED. Yet, specific evidence-based guidelines for assessment and treatment of EDs have been developed. The feeding and eating disorders category in DSM-5 now also includes pica, rumination, and avoidant/restrictive food intake disorder (ARFID), which were previously part of the *Disorders Usually First Diagnosed in Infancy, Childhood, or Adolescence*. Those disorders will not be discussed in this article.

Anorexia Nervosa

Anorexia Nervosa (AN) is characterized by severe emaciation from self-driven food refusal, motivation for weight-loss, and a perception of being overweight in spite of a very low body weight.[6] A restricting subtype has been differentiated from a binge-purge subtype, where the former aims to control weight through restraining dietary intake and the latter engages in episodes of binge eating or purging behavior or both (eg, self-induced vomiting, laxative abuse, diuretics).[7] AN typically develops during adolescence and is the third most common chronic illness among female teens.[8] Lifetime prevalence rates have been estimated up to 1% in females and 0.3% in males.[4] Psychological comorbidity is present in over half of cases, and anxiety and depressive disorders are particularly common.[4] In addition, mortality in AN is strikingly high, with some estimates suggesting that it is 12 times higher than the death rate associated with all causes of death for females 15-24 years old.[9,10] The interplay between neurobiological, psychological, and environmental factors in AN are difficult to disentangle and treat.[11] As a result, treatment effectiveness for AN is limited,[12] which may be a reason for the disorder's chronic course, frequent relapse, high treatment cost, and disease burden.[13] There is no medication that has been approved for the treatment of AN, and it remains uncertain what psychotherapeutic approach might work best.[14] Importantly, atypical antipsychotic medication has often been used, but their effectiveness has been controversial. The largest double-blind, controlled study that tested in adolescent AN and the use of atypical antipsychotics researched whether risperidone is helpful in treatment, but the study did not show benefits.[15] Weight restoration[16] is still the most "likely to be beneficial" treatment[17] and is reinforced by meal support.[18]

Bulimia Nervosa

Bulimia Nervosa (BN), a disorder characterized by repeated episodes of binge eating and purging in the presence of shape and weight concerns, is more prevalent than AN,[19] affecting 1.5% of females and

Anorexia Nervosa		
27%	Good Outcome	~ 35% with AN will develop BN
25%	Partially recovered	
39%	Chronic course	
8%	Deceased at follow up (12 years)	

Flchter, Quadflleg, & Hedlund, 2006

Bulimia Nervosa		
50%	Full recovery	~ 25% with BN will develop AN
27%	Partially recovered	
23%	Chronic, non-remitting	Tozzi et al., 2005

Stelnhausen & Weber, 2009

Table 1. Treatment prognosis in eating disorders.

0.5% of males.[4] BN can be difficult to identify given that patients are typically of normal weight and tend to be secretive about engaging in ED behavior.[20] Like AN, BN etiology is complex and thought to be a consequence of biological, psychological, and cultural factors.[21] BN is associated with significant psychological and medical comorbidity including mood, anxiety, and substance use disorders,[4] as well as electrolyte imbalances and arrhythmias.[22] Increased mortality in BN (from all causes) is comparable to estimates in AN at about 1.5 times the rate in the general population; however, death by suicide is 6-7 times greater in BN than in the general population, which is significantly higher compared to AN with a 4-5 times increased risk.[3] Like in AN, the recovery rates for BN are rather modest and there is significant overlap and fluctuation in symptoms across these disorders during both the course of illness and recovery process, as illustrated in Table 1-Treatment Prognosis.[23,24] Although slightly better than what is observed in AN, BN is also associated with chronicity and frequent relapse. Psychological and pharmacological interventions, such as Cognitive Behavioral Therapy (CBT), Interpersonal Psychotherapy (IPT), and antidepressant medication treatment, have shown to be efficacious in the treatment of BN,[25,26] but still approximately half of individuals will continue to suffer from partial or full forms of the illness or experience relapse.[20]

Other Eating Disorders Including Binge Eating Disorder (BED)

Eating disorder not otherwise specified (EDNOS) in the DSM-IV-TR,[6] which has been replaced with *Other Specified Feeding or Eating Disorder* as well as *Unspecified Feeding and Eating Disorder* in the new DSM-5,[27] is a residual category meant to classify individuals with clinically-significant ED symptoms who fail to meet the specific diagnostic criteria of AN, BN, BED, or ARFID, and has been associated with levels of symptomatology, psychosocial impairment, and mortality risk comparable to these illnesses.[3,28-30] In previous research, EDNOS has been cited as the most common ED diagnosis in clinical settings,[29-31] where approximately 60% of outpatient ED clinic patients met criteria for this disorder.[32] Binge Eating Disorder (BED), formally part of EDNOS and now its own formal diagnosis in DSM-5,[27] is characterized by the presence of repeated binge eating episodes in the absence of compensatory behaviors along with associated features (eg, eating rapidly, feeling guilty after eating, and eating when not physically hungry). BED has received increasing attention in the literature and is considered the most prevalent formal ED, affecting up to 3.5% of females and 2.0% of males.[4] A majority of individuals with BED have psychiatric comorbidity (eg, depression, anxiety, and/or substance use disorders) and more than 60% of those suffering from BED are also obese.[4,33] Like BN, some efficacious psychological and pharmacological treatments are available for BED; however, few with the disorder ever seek treatment[34] and many continue to suffer from prolonged ED and associated medical symptoms over time.[35] With BED now being a formal diagnosis, insurance companies will be more likely to reimburse treatment, and treatment programs for this disorder will become more available. This will also stimulate research for better treatment options for BED.

In order to have more defined types of EDs and reduce the number of patients that are included in the EDNOS group, a new category has been included in DSM-5: *Other Specified Feeding or Eating Disorders* (OSFED). That group further includes Atypical Anorexia Nervosa, where the individual's weight is

within or above normal; Binge Eating Disorder of low frequency or limited duration; Bulimia Nervosa of low frequency or limited duration; Purging Disorder: Recurrent purging in the absence of binge eating; and Night Eating Syndrome: Recurrent night eating that is not better explained by environmental influences or social norm or by another mental health disorder (eg BED). Research over the next years will have to show the validity or clinical utility of those categories.

Assessment

The assessment of individuals with EDs usually involves a multidisciplinary assessment that includes psychiatry, psychology/psychotherapy, medical monitoring, and nutrition evaluation. General psychiatric assessment and management is critical, and includes management of comorbid conditions, coordinating care and collaborating with other clinicians, and assessing and observing eating disorder symptoms and behaviors. A psychotherapist typically provides individual and family psychotherapy, as well as ongoing assessment, and monitoring the patient's safety and mental health status. A primary care provider should evaluate and monitor the patient's general medical condition. A dietician may be involved to evaluate eating patterns and recommend an optimal nutrition plan, taking into account weight restoration needs and eating disorder symptoms impacting nutrition and health. A detailed description of these aspects of treatment and assessment can be found in the American Psychiatric Association's practice guidelines for eating disorders.[2]

Laboratory Assessments for Patients with Eating Disorders

Special attention must be paid to laboratory studies to assess and monitor medical stability and eating disorder severity, as indicated in Table 2-Laboratory

Laboratory Assessments

Basic Analyses—All patients with eating disorders
Blood chemistry studies
Serum electrolytes
Blood urea nitrogen
Serum creatinine (interpretations must incorporate assessments of weight)
Thyroid-stimulating hormone test; if indicated, free T4, T3
Complete blood count including differential
Erythrocyte sedimentation rate
Aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase
Urinalysis
Additional Analyses—Malnourished and severely symptomatic patients
Complement component 3a
Blood chemistry studies
Serum calcium
Serum magnesium
Serum phosphorus
Serum ferritin
Electrocardiogram
24-hour urine for creatinine clearance
Osteopenia and Osteoporosis Assessments—Patients amenorrheic for >6 months
Dual-energy X-ray absorptiometry
Serum estradiol in female patients
Serum testosterone in male patients

Nonroutine assessments
Toxicology screen–Patients with suspected substance use
Serum amylase–Patients with suspected surreptitious vomiting
(fractionated for salivary gland isoenzyme if available to rule out pancreatic involvement)
Gonadal Hormones–Patients with persistent amenorrhea but who are normal weight
(Serum luteinizing hormone, follicle-stimulating hormone, -human chorionic gonadotropin, prolactin)
Brain imaging–Patients with significant cognitive deficits, other neurological soft signs
(Magnetic resonance imaging, computed tomography)
Stool for guaiac–Patients with suspected GI bleeding
Stool or urine for laxatives–Patients with suspected laxative abused
(Bisacodyl, emodin, aloe-emodin, rhein)

Table 2. Laboratory Assessments.

Assessments.

Some experts recommend assessment of complement component 3 as a marker for nutritional deficiencies even when other laboratory test results are in the normal range.[36,37] During hospital re-feeding, serum potassium, magnesium, and phosphorus levels should be assessed daily for 5 days until adequate calories have been reached to sustain weight gain. Some suggest further lab testing thereafter 3 times per week for 3 weeks, but the clinical utility of those ongoing lab tests may not be significant.[38,39]

Treatment–Levels of Care

There are typically 6 levels of care available for EDs[16]: (1) outpatient treatment (OTP), (2) intensive outpatient treatment (IOP), (3) partial hospitalization (PHP, most effective if administered for at least 8 hours/day, 5 days/week; less intensive care is demonstrably less effective[40]), (4) residential treatment center treatment (RTC), (5) specialized eating disorder focused psychiatric inpatient hospitalization treatment (IP) designed for both medical stabilization and acute stabilization of behavioral considerations; and (6) inpatient medical care (IMC) focused primarily on medical stabilization. Level of care can be determined by a variety of factors, including medical status, suicidality, body weight, motivation to recover, co-occurring disorders, structure needed for eating and gaining weight, ability of the family to manage eating disorder behaviors, the ability to control compulsive exercising or urging behavior (laxatives and diuretics), and what treatment is available in a specific geographical region. The described levels or care are adapted and modified from La Via et al.[41] The APA last published guidelines for care of patients with EDs in 2006. The guidelines were primarily based on care of adults, and not adapted specifically for children and adolescents. Research over the past decade, along with improvements in access to care, earlier identification of eating disorders, and a focus on evidence-based care specifically for children and adolescents, have led to an emphasis on providing care in lower levels of care whenever possible. Inpatient medical, psychiatric, and residential care for EDs are very high cost when compared to PHP and outpatient interventions, without clear evidence of improved outcomes. For instance, one study compared PHP with IP care for adolescent AN, and found 1 year after treatment no benefit of prolonged IP treatment over PHP after an initial 3-week hospitalization for medical stabilization.[42] Another study that assessed adolescents with AN 1, 2, and 5 years after treatment also did not find benefits form prolonged IP treatments, suggesting that IP is not a cost-effective level of care.[43]

For medical reasons, IMC is indicated for patients with heart rate <40 bpm; blood, pressure <90/60 mmHg; glucose <60 mg/dl; potassium <3 mEq/L; electrolyte imbalance; temperature <97.0°F; dehydration; hepatic, renal, or cardiovascular organ compromise requiring acute treatment; or poorly controlled diabetes. For children and adolescents, criteria have been slightly modified to when heart rate is close to 40, orthostatioc blood pressure changes with >20 bpm increase in heart rate or >10 mmHg to 20 mmHg drop, a blood pressure <80/50 mmHg, hypokalemia, hypophosphatemia, or hypomagnesaemia.

IP (medical or specialized eating disorder psychiatric units) is also indicated when body weight, as percent-

age of healthy body weight, is <85%, or when there is acute weight decline with food refusal even if not <85% of healthy body weight. RTC can be indicated when body weight as percentage of healthy body weight is <85%, PHP and IOP are indicated when body is >80% of healthy body weight, and OTP when body weight >85% of healthy body weight. DSM-5 is less strict with weight criteria compared to previous guidelines. For instance, a patient who has been at a higher than normal weight premorbidly may qualify after weight loss for AN even if at a weight >85% of normal. Rate of weight loss must also be taken into account, and very fast weight loss may put someone at risk for re-feeding syndrome, and require IP treatment.

Admission is indicated if there is acute suicidality, including a specific plan with high lethality or intent; admission may also be indicated in patients with suicidal ideas or after a suicide attempt or aborted attempt, depending on the presence or absence of other factors modulating suicide risk. Suicide risk assessment is a complex problem and specific guidelines should be adhered to for this assessment.[16] A general psychiatric inpatient unit may be needed for patients with significant suicidal ideation, or suicidal or self-injurious behavior, in case it cannot be handled on the ED inpatient unit. Motivation to recover, also described as "readiness for change" (RFC), includes cooperativeness, insight, and ability to control obsessive thoughts and respond to supervision and support, and has been linked to positive treatment outcomes. The determination of level of motivation, or RFC, must be assessed carefully, taking each patient's specific background into consideration.[44] OTP is often adequate for patients with fair-to-good motivation and IOP is often adequate for patients with fair motivation. For patients with partial motivation (defined by patients who are cooperative, but preoccupied with intrusive, repetitive thoughts >3 hours/day, and having difficulty interrupting eating disorder behaviors), PHP is more likely to be the most effective and least restrictive level of care necessary. RTC may be indicated for patients with low motivation, and RTC for patients who have not been successful in other levels of care, including brief inpatient stabilizations. Patients with low/poor motivation are preoccupied with intrusive, repetitive thoughts, which impact their behavior, and require the external structure and constant supervision of a highly-structured treatment environment.

However, there are also questions that have been raised about RTC treatment. First, those centers are expensive, and their quality of care is variable, and largely unregulated.[45] Second, there are positive reports published on outcome from RTCs, but there are no comparative studies with other treatment modalities. This has been especially brought to the forefront in the context of family-based treatments, as RTCs are typically far from home, and the families may be less involved than maybe necessary. In general, RTC treatment may be particularly suitable for patients with severe comorbid conditions, chronic self-harm, and personality disorders.[46] IP is indicated for patients whose medical condition or intensity of behaviors require 24-hour care before transition to PHP or OTP. Patient with higher levels of awareness, insight, and motivation are likely to improve more quickly, and accept interventions and support with less distress.

Comorbid conditions, including substance use, have to be assessed individually for each patient, and taken into consideration for determination of level of care.

For patients with severe food-avoidance behaviors, nasogastric feeding may be necessary, which is usually initiated during an inpatient stay on a medical, psychiatric, or specialized eating disorder unit. OTP and IOP are often adequate for patients who are able to eat with family support. PHP is useful both for stabilizing eating disorder behaviors when the family is able to provide support and supervision in the evenings, and for supporting the transition to home and school. RTC are indicated for patients who need a higher level of supervision, and have not been able to make progress in the home environment due to severity of their symptoms, or challenges in their primary support system. It is critical to carefully evaluate the ability of parents to support—and actively participate in—treatment for children and adolescents. Families who are not willing or able to participate in care are more likely to require more extended interventions and higher levels of care than families who are motivated and engaged in treatment of the child with an eating disorder.

Patients with severe purging behaviors who need supervision during and after all meals and in bathrooms, and are unable to control multiple daily episodes of purging that are severe, persistent, and disabling, despite appropriate trials of outpatient care, need IP level of care, even if routine laboratory test results

reveal no obvious metabolic abnormalities. If there are no significant medical complications from purging behavior, such as electrocardiographic or other abnormalities that suggest the need for hospitalization, then patients may be managed on OTP, IOP, or PHP levels of care.

Severe environmental stress or family conflicts can make higher levels of care necessary. Another reason for higher level of care can be when a patient has to travel out of state for a specialized ED treatment program, and RTC or IP are the only viable alternatives.

For BN, in general, outpatient treatment is recommended, except when there are complicating factors (eg, serious general medical problems, suicidal behavior, or psychosis), or severe disabling symptoms that do not respond to outpatient treatment. A study compared 2 options for such patients: IP and PHP treatment. In that study, 55 patients with severe BN were randomly assigned to either one of those settings. At 3 months post-treatment, both treatments were associated with reduced general and specific pathology.[47] While more deterioration in bulimic symptoms occurred following IP than day clinic treatment, the results overall were found to be comparable.

Treatment–Specific Interventions

Controlled Treatment Studies

Anorexia Nervosa		Bulimia Nervosa	
Likely to be Beneficial–Anorexia Nervosa		**Likely to be Beneficial–Bulimia Nervosa**	
Re-feeding	Rigaud et al, 2007	Cognitive Behavioral Therapy (CBT)	Hay et al, 2007
Clinical Evidence	Fitzpatrick and Lock, 2011	SSRIs (FLXT, Citalopram, Sertraline)	Shapiro et al, 2007
		Monoamine Oxidase Inhibitors	Bacalchuc, 2002
		Tricyclic antidepressants (desipramine / imipramine)	Shapiro et al, 2007
Unknown Effectiveness		**Unknown Effectiveness**	
Atypical Antipsychotics	Mehler-Wex et al, 2008	CBT + Exposure, Resp. Prevention	Hay et al, 2007
Benzodiazepines	No syst. review, RCTs	Interpersonal Psychotherapy	NICE, 2004
Cyproheptadine	Halmi et al, 1986	Guided Self Help CBT	Bailer et al, 2004
SSRIs	Claudino et al, 2010	Dialectical Behavioral Therapy	Hay et al, 2007
Pyschotherapy	Hay et al, 2010	Hypnotherapy	Griffiths et al, 1994
Inpatient vs Outpatient Tx	Bulik et al, 2007	Motivational Enhancement	Treasure et al, 1999
Estrogen for osteoporisis	Klibanski et al, 1995	Pharmacotherapy + CBT	Shapiro et al, 2007
		Mirtazpine	no syst. Review, RTC
		Reboxetine	no syst. Review, RTC
		Venlafaxine	no syst. Review, RTC
		Topiramate	Arbaizar et al, 2008
Likely to be Ineffective or Harmful			
Older Generation Antipsychotics	Relly et al, 2000 Claudino et al, 2010		
Tricyclic Antidepressants			

Table 3. Summary of Anorexia Nervosa and Bulimia Nervosa.

Table 3 illustrates the summary by Fitzpatrick and Lock (2011), and Hay and Claudino (2012) of the studies that were available at the time.[12,17,48-63]

In addition, a variety of other studies have been reported on since that time, as summarized in Guideline Watch (August 2012).[64] A few studies assessed the effects of nasogastric feedings in open trials. In one trial[49] AN patients were randomly assigned to a tube-feeding group (n=41) or a control group (n=40). After 2 months, weight gain was 39% higher in the tube-fed group, and binge-eating episodes were lower. The tube-fed group also had a longer relapse-free period after discharge (34.3±8.2 weeks vs 26.8±7.5 weeks). In another study,[65] adult outpatients with AN or BN were randomly assigned to 2 months of cognitive behavioral therapy (CBT) alone (n=51) or CBT plus tube feeding (n=52). CBT plus tube feeding led to more rapid and frequent abstinence from binge eating and purging, more improvement on depression and anxiety, and patients reported better quality of life. A 1-year follow up further supported those results. BMI for patients in the tube feeding plus CBT arm was 18.2±3.3, and the analysis did not separate normal-weight patients with BN from patients with AN, binge-eating purging type. In general, nasogastric tube feeding is not recommended for normal weight patients.[16,64] A recently-developed treatment modality, *enhanced* CBT, which includes aspects of interpersonal therapy (IPT), was applied to 125 patients at a public outpatient clinic.[66] Reportedly two-thirds of those who completed treatment (and 40% of the total) achieved partial remission. However, only 53% completed the treatment.

Medication use in AN generally has not been effective for weight gain, but a review of 4 randomized controlled trials and 5 open-label trials suggested that olanzapine, quetiapine, and risperidone may improve depression and anxiety, and maybe core eating cognitions.[67] In another study that assigned 23 outpatients with AN to 8 weeks of olanzapine (2.5 mg/day, up to 10 mg/day as tolerated) or to placebo,[68] patients receiving olanzapine showed a small (1 point) but significant gain in BMI. However, others found no differences in percentage change in median body weight, rates of weight gain, or improvement in psychological measures 5 or 10 weeks after a small single-site, randomized, controlled trial of olanzapine versus placebo in 15 out of 20 adolescent females who completed the study.[69] Another atypical antipsychotic, risperidone, studied in a double-blind, randomized, controlled trial of 40 hospitalized adolescents with AN,[15] did not provide an advantage (average dose 2.5 mg/day, prescribed up to 4 weeks) over placebo for weight restoration.

New treatment interventions and comparative effectiveness

A relatively new intervention that has been tested in youth with AN is Family-Based Treatment (FBT), a manualized and widely-studied family intervention for adolescent AN. FBT stresses behavioral change by encouraging increased parental control over adolescent maladaptive eating patterns. This intervention has shown higher rates of full remission, and greater improvements 8 to 12 months following treatment with regards to weight and ED pathology compared to family counseling and adolescent focused therapy, an individual outpatient intervention that is geared to improve eating symptoms and emotional tolerance.[70,71] However, longer-term studies of the effectiveness of this intervention and other family treatments are limited. One 5-year follow-up study produced evidence suggesting that when a high level of parental (specifically maternal) criticism is present, the use of separated family therapy, at least initially in treatment, is superior to using conjoint family therapy (as is traditional FBT).[72] However, longer-term studies of the effectiveness of this intervention and other family treatments are otherwise limited. Importantly, new research now shows that in the general OTP setting, FBT is more suitable for less severe cases with AN.[73]

Long Term Outcome Studies

There are different ways to assess long-term outcome. One is to follow patients and determine the naturalistic course of illness. Another method is to study the effects of specific treatment interventions.

Table 4 describes naturalistic follow-up studies, and there is a very wide rage of possible outcomes across studies.

	Study	Population	Sample (N)	Follow-up duration*	Outcome Measures	Findings
AN	Fichter et al. (2006)[74]	Adult and late adolescent women, restricting and binge purging type	103	12	EDI-2, Morgan-Russell Scales†, ED diagnosis (SIAB-EX)	ED cognitions improved but remained significantly elevated compared to controls. Overall, 43% had poor outcome, 27% had intermediate outcome, 30% had good outcome, based on body weight and resumption of menses. Diagnosis data showed 30% obtained long-term, sustained recovery and were ED-free, 43% experienced resurgence of symptoms, and 27% had chronic ED.
	Ratnasuriya et al. (1991)[75]	Adult women and men	38	20	Morgan-Russell Scales†	30% had good outcome, 33% had intermediate outcome, and 37% had poor outcome.
	Eckert et al. (1995)[76]	Severely ill adolescent and adult females§	76	10	Modified Morgan Russell Scale assessing weight, menses, eating disorder behavior and attitudes, and body image disturbance.	24% had a healthy body weight, resumed menses and had no eating or body image concerns; 26% had good medical outcome, but maintained ED attitudes/concerns; 51% had intermediate to poor outcomes, with both medical and psychological ED symptoms.
	Herzog et al. (1999)	Adolescent and adult women, restricting and binge purging type	136	7.5	PSR (ED symptoms): recovery defined as full symptom remission for ≥ 8 weeks.	A minority (34%) recovered, and 84% experienced reduction of symptoms (subthreshold AN) during follow-up period. Shorter duration of illness predicted quicker recovery. 40% relapsed after recovery.
	Lowe et al. (2001)	Adolescent and adult women, restricting and binge purging type	84	21	PSR with recovery defined as full symptom remission (PSR=1) over previous 3 months.	51% recovered and had improvements in psychosocial adjustment; 21% were partially recovered; 26% had poor outcome, including 14% mortality rate due to AN.
	Steinhausen et al. (2000)[77]	Adolescent males and females	60	11.5	11 domains of eating disorder symptoms, sexuality, and psychosocial functioning.	80% of surviving adolescents had recovered, but there was high utilization of treatment throughout follow-up period.
	Strober et al. (1997)[78]	Adolescent male and female inpatients§	95	10-15	Recovery (free from all AN criterion items ≥ 8 weeks), remission, and relapse.	76% met full recovery criteria, with 30% reporting relapses in symptoms during follow-up period. Time to recovery in adolescents is protracted, taking an average of 5-7 years.

	Study	Population	Sample (N)	Follow-up duration*	Outcome Measures	Findings
BN	Zeeck et al. (2011)	Adult day and inpatients	36	3	SCID I and SIAB; ED remission (no b/p) and rare ED preoccupation in the last 3 months	1/3 showed complete remission, 1/3 showed partial remission, and 1/3 continued to have BN.
	Herzog et al. (1999)	Adolescent and adult women	110	7.5	PSR (ED symptoms) and duration of symptoms. Recovery defined as full symptom remission for ≥ 8weeks.	A majority (74%) recovered, 99% experienced reduction of symptoms consistent with subthreshold BN during follow-up period, and 35% relapsed after recovery.
	Fichter & Quadflieg (2004)	Adult female medical inpatients with purging type-BN	196	12	SIAB-EX, EDI-2, PSR	BN symptoms improved. 70% no longer met DSM-IV criteria for an eating disorder, 13% had EDNOS, 10% maintained BN-P diagnosis, and 2% were deceased. Psychiatric comorbidity predicted outcome.
BED	Agras et al. (2009)	Adult females, treatment, and non-treatment seeking sample	104	4	EDE: Remission defined as absence of any eating disorder diagnosis for 6 months.	82% had remitted at follow up.
	Fairburn et al. (2000)	Late adolescent and adult females from non-treatment-seeking sample	48	5	EDE: DSM-IV diagnoses	85% no longer met criteria for an ED after 5 years; 9% maintained BED status.
Other EDs	Fichter et al. (2008)[79]	Adult female inpatients	68	12	SIAB-EX: DSM-IV diagnoses	31% met criteria for an ED at follow up (67% without any ED), where psychiatric comorbidity predicted poor outcome.
	Agras et al. (2009)	EDNOS (excluding BED)	149	4	EDE: Remission defined as absence of any eating disorder diagnosis for 6 months.	78% had remitted at follow up, which occurred more quickly than for those with AN, BN, or BED.

Table 4. Long-term naturalistic studies of recovery, remission, and relapse in eating disorders.
Diagnoses: ED = Eating Disorder, AN = Anorexia Nervosa, BN = Bulimia Nervosa, BED = Binge Eating Disorder; *Measures*: EDE = Eating Disorders Examination, EDI-2 = Eating Disorder Inventory-2, SIAB-EX = Structured Inventory for Anorexic and Bulimic Syndromes, PSR = Psychiatric; Rating Scale, DIS = Diagnostic Interview Schedule, Version III, SCID I = Structured Clinical Interview for DSM-IV Disorders I; *duration in years; § per DSM-III-R criteria; † Morgan-Russell Scales: good, intermediate, poor outcome based on BMI and menstrual status.

There are no uniform treatments used in EDs. Table 5 summarizes studies on outcomes across ED types and treatment modalities used, based on a variety of outcome measures. The primary goal though in AN is weight restoration, BN and BED reduction, or cessation of binge eating and/or purging episodes.

	Study	Population	Sample (N)	Follow-up duration*	Intervention	Outcome Measures	Findings
AN	Eisler et al. (1997)[80]	Adults, subtyped by age of onset, duration of illness, and binge/purge symptoms	77	5	Family Therapy, Individual Supportive Psychotherapy	1) Body weight 2) Morgan-Russell Scale†	Early onset, short duration AN had better outcomes with family therapy. Late onset AN had better outcomes with individual supportive psychotherapy. Poor outcomes in early onset AN with long duration and in binge/purge symptoms.
	Carter et al. (2011)[14]	Adult women, broad AN (BMI ≤ 19.0)	43	6.7	IPT, CBT, SSCM	Global outcome (1, asymptomatic to 4, full AN)	SSCM associated with deteriorating symptoms over time; IPT associated with improved symptoms over time. Overall, no significant differences between treatments at long-term follow up, where half achieved good outcomes.
	Whitney et al. (2012)[81]	Adult inpatients and families	44 AN 82 family members	3	3-day family skills workshop, individual family therapy	1) Caregiver distress, appraisal, expressed emotion 2) Patient BMI, SEEDs, IIP	No significant differences in patient or caregiver outcome between educational workshop or individual family therapy.
	Eisler et al. (2007)[72]	Adolescent outpatients and families	38	5	Family Therapy, conjoint or separated	Morgan-Russell Scale†	76% of patients in both treatments with good outcome. No differences between the 2 family interventions; however, inpatient treatment and maternal criticism predicted poor outcome. Patients with parents endorsing high-expressed emotion had better weight gain in separate family therapy.

	Study	Population	Sample (N)	Follow-up duration*	Intervention	Outcome Measures	Findings
BN	Carter et al. (2003)[82]	Older adolescents and adult females (17-45 years)	113	3	CBT plus B-ERP, CBT plus P-ERP, relaxation training	Frequency of binging and compensatory behaviors, dietary restriction, body dissatisfaction (EDI), depression (HDRS)	69% ED free at follow up, with no differences in outcome in those receiving adjunct behavioral or relaxation therapy.
	McIntosh et al. (2011) - continuation of Carter et al. (2003)[82,83]	Older adolescents and adult females (17-45 years)	109	5	CBT plus B-ERP, CBT plus P-ERP, relaxation training	Frequency of binging and compensatory behaviors, dietary restriction, body dissatisfaction (EDI), depression (HDRS)	65% without ED diagnosis. Abstinence rates from binging were significantly higher for the exposure treatments (than for relaxation). Frequency of purging was lower for the exposure treatments than relaxation training. No differences in other measures observed between treatments.
	Fairburn et al. (1995)[84]	Adults	89	5.8	CBT, behavioral therapy, FIT	ED symptoms and diagnoses (EDE), general psychopathology (SCID), BSI, APFAI, social adjustment	CBT and FIT were associated with greater remission status than behavior therapy. CBT associated with lower ED symptoms overall compared to other treatments.
	Keel et al. (2002)[85]	Adult females	101	10	CBT, antidepressant medication (imipramine), placebo	Depression (HDRS), body dissatisfaction (EDI), BSQ, EDE-Q, SAS	No long-term differences in depression, body dissatisfaction, or bulimic symptoms. Active treatments (CBT and/or imipramine) was significantly associated with improvement in social adjustment.
	Nevonen and Broberg (2006)[86]	Adult females (18-24 years)	69	2.5	CBT plus IPT, group and individual format	Frequency of binge eating & compensatory behaviors, ED symptoms, general psychopathology (RAB, EDI-2, IIP, SCL, BDI, BMI)	Greater improvements in binging and compensatory behavior in individuals receiving individual therapy. No other differences between treatments.
	Thiels et al. (2003)[87]	Adults	28	4	GSH plus 4 CBT sessions, 16 CBT sessions	EDE: overeating, vomiting, dietary restraint, shape and weight concerns, BITE, BDI, Self-Concept Questionnaire	Significant improvements in both groups in terms of outcome measures with no differences between treatments.
BED	Wilson et al. (2010)[88]	Overweight/ Obese Adults	205	2	IPT, BWL, CBT - GSH	Binge Eating Frequency (EDE)	IPT and CBT resulted in greater binge eating remission than BWL at follow up.

	Study	Population	Sample (N)	Follow-up duration*	Intervention	Outcome Measures	Findings
	Ricca et al. (2010)[89]	Full and subthreshold adult BED	144	3	Individual and group CBT	EDE, EDE-Q, BES, EES, BMI	Significant reductions in binge eating frequency and mild weight reduction in both treatments. Lower emotional eating and binge eating severity at baseline predicted full recovery; low emotional eating predicted weight reduction.
	Munsch, Meyer, and Biedert (2012)[90]	Overweight/ Obese Adults	52	6	CBT, BWL	Binge eating frequency, eating disorder pathology (EDE-Q), BDI, BMI	CBT associated with lower binge frequency. In both treatments, binge eating and general ED pathology improved during active treatment. Compared to baseline, symptoms improved at 6-year follow up. Only 8% individuals continued to meet criteria for BED with 19% abstinent from binge eating in previous month.

Table 5. Long-term treatment outcome studies in AN, BN, and BED.
Diagnoses: AN = Anorexia Nervosa, BN = Bulimia Nervosa, BED = Binge Eating Disorder; *Treatments*: IPT = Interpersonal Psychotherapy, CBT = Cognitive Behavioral Therapy, SSCM = Specialist Supportive Clinical Management, FIT = Focal Interpersonal Therapy, B-ERP = Binging Exposure and Response Prevention, P=ERP = Purging Exposure and Response Prevention, GSH = Guided Self-Help, BWL = Behavioral Weight Loss; *Measures*: BMI = Body Mass Index, EDE = Eating Disorders Examination, EDE-Q = Eating Disorder Examination Questionnaire, EDI-2, Eating Disorders Inventory 2, GAF = Global Assessment of Functioning, HDRS = Hamilton Depression Rating Scale, SEEDs = Short Evaluation of Eating Disorders, IIP=Inventory of Interpersonal Problems, BSI = Brief Symptom Inventory, APFAI = Adult Personality Functioning Assessment Interview, BSQ = Body Shape Questionnaire, SAS = Social Adjustment Scale, RAB = Rating of Anorexia and Bulimia Interview, SCL = Symptoms Checklist, BITE = Bulimic Investigatory Test Edinburgh, BES = Binge Eating Scale, EES = Emotional Eating Scale; * duration in years; † Morgan-Russell Scales: good, intermediate, poor outcome based on 1) nutrition, 2) menstruation, 3) mental state, 4) psychosexual function, 5) social functioning

The Treatment in the Eating Disorder Program at Children's Hospital Colorado

Our model is based on existing evidence emphasizing the important role of the family in child and adolescent onset EDs. The program is innovative and unique with families engaged daily in treatment, planning meals for their child in all levels of care, and participating in daily meals and program therapies. We provide consultation and support to other academic centers and private for-profit programs in efforts to improve their own approaches to care and program development. The emphasis of treatment is on helping families build the skills they need to help their child recover at home. Family-Based Therapy (FBT) principles of empowering parents to effectively manage eating disorder symptoms are integral to our Parent-Supported Nutrition (PSN) model of care.[92-94] This approach in the treatment of child and adolescent onset AN has facilitated shifting to lower levels of care more quickly (PHP, IOP, OP). The emphasis in treatment is on parent training and skills for managing symptoms at home, which decreases the need for time away from the family and school. Models of care for children, adolescents, and adults with EDs vary widely across the United States and have typically em-

phasized residential treatment when a patient did not improve with outpatient care. RTC care typically lasts 60-120 days, and the children are separated from their parents for the majority of the episode of care, creating challenges in the transition to home. While there are still many residential programs (RTC) in the U.S., there has been a significant shift to specialized outpatient care and day treatment, with inpatient care primarily used for medical stabilization. Lower levels of care are less disruptive to family and school functioning, are more cost effective, and research shows similar or even improved outcomes.

The specialized Eating Disorder Program in the Department of Psychiatry, Division of Child and Adolescent Psychiatry at the University of Colorado Anschutz Medical Campus, is embedded within the Children's Hospital Colorado and provides specialized medical floor care, Inpatient Eating Disorder Unit (IP-EDU), PHP, IOP, as well as OTP levels of care. The IP-EDU allows patients who still need nurse supervision, cardiac monitoring, and low activity to be moved from the medical floor to the Eating Disorder Program quickly, for intensive family-based therapy and parent involvement in care, while still medically stabilizing (improving heart rate and weight) to a point that the patient can safely sleep at home. This also allows the hospital to improve access to medical beds, decreases cost of care, and improves the ability of the parent and child to work together during the day in our therapeutic milieu. Our parent-supported recovery model, which includes parent skills training and parent-supported nutrition (PSN), has decreased the number of admissions to the inpatient level of care, and decreased the length of stay in both inpatient and PDT levels of care. More patients are triaged to outpatient family-based therapy. Patients admitted to higher levels of care (day treatment or inpatient) average about 24 days in program over 5 weeks in which time the emphasis is on teaching parents meal planning and meal-support skills, as well as helping them learn and practice skills for more effective communication and improving the family structure. Patients can admit to any of the levels of care described in the following section, and level of care is determined through evaluation of medical, behavioral, and emotional symptoms, and the families' capability to participate in care. The emphasis for patients is on skill-building for tolerating the external structure and containment, which serves to interrupt eating disorder behaviors and drives.

Children's Hospital does not have a residential level of care, as the program emphasizes keeping children and adolescents with their families and in their home communities.

Intake and Treatment Process, and Levels of Care

Initial intake consultation and triage: A therapist from the eating disorder team and an adolescent medicine physician evaluate the child, gathering information about the current concerns, symptoms, and contributing factors, and determine if an eating disorder is likely. The parents are also interviewed, and a team recommendation is discussed with the family for treatment interventions. Decision-making about the most appropriate, least restrictive level of care is based on the following points.

- *Outpatient level of care*: Medically stable (HR > 50, weight > 80% IBW, electrolytes stable). Guardian able and willing to provide additional support and supervision and to be active in treatment. Able to weight restore over the first month of outpatient care.
- *Inpatient Medical Unit admission*: Medically unstable, resting HR < 45 (HR < 35 at night), rapid weight loss, weight < 75% IBW, low kcal intake (< 1000 / kcal / day), risk of refeeding syndrome, need for bed rest to interrupt weight loss. Transition to inpatient EDU when HR is > 35 at night.
- *Inpatient Eating Disorder Unit admission*: HR resting HR 45-50 (HR > 35) at night, rapid weight loss or low kcal intake (1000 – 1500 kcals), weight < 80% IBW, significant resistance from child to parents' efforts to provide support and supervision. May also have safety issues such as suicidal ideation or self-injurious behaviors.
- *Extended Day Treatment Program (10-12 hours)*: More likely to be recommended if family has not been successful with outpatient care. Medically stable, but unable to interrupt eating disorder behaviors at home. Family and patient need more support and coaching to be successful at home.
- *Regular Day Treatment program (7 hours)*: Partial success with PSN/FBT principles in outpatient level of care, medically stable, family and patient need more support and coaching to be successful at home.
- *Intensive Outpatient Program*: Monday, Tuesday,

Thursday, 2:30–5 PM. Multifamily model of care, emphasis on continued recovery, relapse prevention and adapting PSN/FBT-based principles to home and school, as well as supporting gradual transitions to normalized eating and activities. Families can enroll in IOP if they need more support than weekly outpatient therapy, or as part of the transition from higher levels of care.

Conceptual Description of Treatment Phases

CHCO Eating Disorder Program–Parent Supported Nutrition: Five Phases of Care

These 5 phases are typically accomplished over 5-6 weeks and about 24 days in program.

The treatment program in higher levels of care includes a step-down model, which allows families to practice meals at home and transition more smoothly to caring for their child at home.

Outpatient care follows a similar model, with weekly visits over 2-3 months. Children usually continue to attend school if they are in outpatient care.

Each family entering a higher level of care is administered a clinical assessment comprised of a variety of measures including assessment of comorbid anxiety and depression, eating disorder severity, personality features, family satisfaction and communication, perceived expressed emotion, and parent-perceived empowerment. The results of this comprehensive assessment informs the families' individualized treatment plan and road map to how they can most effectively use our program resources, and help the treatment team define personalized family treatment goals within each of the 5 phases of care. The measures are re-administered after 3 weeks in program to delineate areas of growth and identify continued areas for growth in an effort to help support the families as they begin to transition home.

The phases are not dependent on level of care.

Neurobiological Research in Eating Disorders and Brain Research at the Children's Hospital Colorado (CHCO) Eating Disorders Program

CHCO Parent-Supported Recovery 5 Phases of Care

Phase 1	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**
Family: Initiating Parent-supported Nutrition (PSN/) Patient learning expectations and rules of PSN	Family: Improving PSN skills Patient beginning to trust family with PSN	Adapting PSN to home Learning about triggers and making adaptations	Practicing PSN outside the program	Transition
Stabilize eating disorder behaviors Medical stabilization	Able to complete meals with parent support	Medically stable, ED behaviors improving Able to begin to increase activity, increasing food tolerance and variety	Transition to shorter day treatment and days out of program Following meal plan at home	Begin transition back to school
Parents learn meal planning and meal support skills	Parents begin to learn meal planning for home	Completing breakfast out of program	Parent able to adjust plan and activity based on needs	Parent managing nutrition needs flexibly at home
Evaluating motivation, factors maintaining the eating disorder, challenges to providing structure and support	Parents and child gain understanding of eating disorder and approaches to tolerating distress while managing symptoms and decreasing behaviors	Parents and child working together on interrupting eating disorder drives and behaviors and reducing symptoms, identifying values and motivation for recovery	Managing challenges at home, parent in strong supportive role. Child's motivation improving through practicing value-driven behavior	Family able to adjust life and school to need for supervision of meals and activity. Working together well to manage challenges.

Table 6. Parent-Supported Recovery 5 Phases of Care.

Over the past decade, brain imaging has helped better define eating disorder-related brain circuitry.[95] Brain research on gray and white matter volumes had been inconsistent, possibly due to the effects of acute starvation, exercise, medication, and comorbidity, but newer studies are controlled for such effects. Those studies suggest larger left medial orbitofrontal gyrus rectus volume in ill adult and adolescent anorexia nervosa after recovery from anorexia nervosa, and in adult bulimia nervosa. The orbitofrontal cortex is important in terminating food intake, and altered function could contribute to self-starvation. The right insula, which processes taste but also interoception, was enlarged in ill adult and adolescent anorexia nervosa, as well as adults recovered from the illness. The fixed perception of being fat in anorexia nervosa could be related to altered insula function. A few studies investigated white matter integrity, with the most consistent finding of reduced fornix integrity in anorexia and bulimia nervosa, a limbic pathway important in emotion, but also food intake regulation. Functional brain imaging using basic sweet taste stimuli in eating disorders during the ill state or after recovery implicated repeatedly reward pathways, including insula and striatum. Brain imaging that targeted dopamine-related brain activity using taste-reward conditioning tasks suggested that this circuitry is hypersensitive in anorexia nervosa, but hypo-responsive in bulimia nervosa and obesity. Those results are in line with basic research, and suggest adaptive reward system changes in the human brain in response to extremes of food intake—changes that could interfere with normalization of eating behavior.

In addition to providing evidence-based high quality of care, the CHCO Eating Disorder program and team are focused on improving care and disease outcomes through active research protocols. The Developmental Brain Research Program focuses on brain-imaging of reward mechanisms in the brain, how underlying traits may predispose to development of an eating disorder, and what biological mechanism may hinder recovery. These studies contribute to our approaches to care by impacting how we understand the cognitive processes of individuals with AN, such as intolerance of uncertainty, harm avoidance, motivation, and reward-seeking behaviors. All patients and families in the program also have the opportunity to participate in the Outcome Study, which is embedded in the clinical program, and allows information from their clinical care to be used for studies of factors that influence onset, maintenance, and outcome of treatment. Through this work, we hope to develop more effective and efficient interventions to shorten duration of treatment, decrease severity and duration of illness, and improve overall life functioning.

Most importantly, we use this new knowledge to build models for ED brain pathology, considering how it may affect treatment and outcome. We present this information in a regular parent seminar, which is typically very well received.

Future Research Directions

Treatment interventions for children and adolescents with EDs should be focused on stabilizing disordered eating behavior and restoring optimal health for normal growth and development. Level of care should be determined by symptom severity, medical stability, and ability to make progress in lower levels of care (outpatient, and day treatment) with higher levels of care, primarily recommended for medical instability or concern for self-injurious behaviors or severely dysregulated eating behavior that has not responded to lower levels of care. Diagnosis of co-morbid conditions and specific symptom-based treatment planning (including consideration of medications) to encompass both the eating disorder and co-morbid diagnoses is recommended. Further research is needed on components of care that improve outcomes and can improve cost effectiveness of treatment interventions.

Further research is needed to understand factors that contribute to onset and maintenance of AN, BN, and other EDs, as well as factors contributing to successful treatment and recovery. There are many symptoms, such as food restriction, episodic binge eating, purging, or excessive exercise that are either overlapping or lie on opposite ends of a scale or spectrum across those disorders. Identifying how specific ED behaviors are linked to particular neurobiological mechanisms could help better categorize ED subgroups and develop specific treatments. There is support from recent brain imaging research that brain structure and function measures can be linked to disorder-specific biological or behavioral variables, and can help distinguish, or find commonalities between ED subgroups. This suggests that brain structure and function may be suitable as research targets to further study the re-

lationship between dimensions of behavior and brain function relevant to EDs and beyond the categorical AN, BN, and BED distinctions.

Resources

There are a variety of organizations that provide information both for patients afflicted with eating disorders, and for professionals in the eating disorder treatment field, including therapists, medical doctors, and nutritionists.

Academy for Eating Disorders, AED: www.aedweb.org

The Academy for Eating Disorders is a global professional association committed to leadership in eating disorder research, education, treatment, and prevention.

Alliance for Eating Disorders: http://www.allianceforeatingdisorders.com

National Association of Anorexia Nervosa & Associated Disorders (ANAD): www.anad.org

ANAD advocates for the development of healthy attitudes, bodies, and behaviors. ANAD promotes eating disorder awareness, prevention, and recovery through supporting, educating, and connecting individuals, families, and professionals.

Binge Eating Disorder Association (BEDA): www.bedaonline.com

BEDA is the national organization focused on increasing prevention, diagnosis, and treatment of BED and associated weight stigma. Through outreach, education, and resources, BEDA is committed to facilitating awareness, excellence in care, and recovery for those who live with and those who treat binge eating disorder and its associated conditions.

Eating Disorders Coalition: www.eatingdisorderscoalition.org

The Eating Disorders Coalition for Research, Policy, and Action is working in Washington, D.C. to increase awareness, educate policymakers, and promote understanding about the disabling and life-threatening effects of eating disorders. Its mission is to advance the federal recognition of eating disorders as a public health priority.

International Association of Eating Disorders Professionals (iaedp): http://www.iaedp.com

The International Association of Eating Disorders Professionals Foundation's (iaedp) goal is to provide excellence in providing first-quality education and high-level training standards to an international multidisciplinary group of various healthcare treatment providers, and helping professions that treat the full spectrum of eating disorder problems.

National Eating Disorders Association, NEDA: www.nationaleatingdisorders.org

NEDA supports individuals and families affected by eating disorders, and serves as a catalyst for prevention, cures, and access to quality care.

National Institutes of Mental Health (NIMH): http://www.nimh.nih.gov/health/publications/eating-disorders-new-trifold/index.shtml

This federal institution provides information about mental health problems including eating disorders. The site answers the following questions: (1) What are eating disorders, (2) What are the different types of eating disorders, (3) How are eating disorders treated, and (4) What is being done to better understand and treat eating disorders?

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Perinatal, Infancy, and Early Childhood Mental Health

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Introduction

This article addresses a critical time during both infant and child development, as well as during the adult life-cycle: the perinatal period. Treatment of mental health concerns during pregnancy and postpartum stages can be both challenging and rewarding, as there are long-term implications for the parent, infant, and relationship between parent and child. The special topic of adolescent pregnancy is also discussed, as it places both the pregnant teen and the infant at high risk for complications. The importance of addressing the needs of infants and young children, as well as potential disruptions in their relationships with primary caregivers within a continuum of care for mothers, cannot be overemphasized. Adverse life events in childhood, often now referred to as *toxic stress*, are known to have long-term implications for mental and physical health in adulthood.[1] Appropriate therapeutic and medication interventions during pregnancy, postpartum, and early childhood to decrease the impact of mental illness and stressful life events on mothers and their children will have lasting results for families.

Pregnancy Related Depression and Other Psychiatric Disorders in the Perinatal Period

Maternal depression and anxiety is increasingly recognized as an important public health issue, with implications not only for the mother, but also the long-term outcomes in infants and children. Depression, anxiety, and bipolar disorder commonly begin in women during childbearing ages. Nationally 10%-23% of women will develop depression during pregnancy and the postpartum period.[2-4] This makes depression one of the most common complications of pregnancy. Specifically in Colorado, 1 out of 9 women who give birth will experience depressive symptoms.[5]

Between 50%-85% of women may experience the *baby blues* in the first 2 weeks postpartum. This includes tearfulness, mood reactivity, and irritability, but not suicidal ideation or significant impairment in functioning. Half of postpartum depression episodes begin during pregnancy. Diagnosis is made with the usual Major Depressive Episode criteria, plus a specifier of with peripartum onset. Women with peripartum depression commonly experience intense anxiety, such as panic attacks and obsessive-compulsive thinking and behaviors. Women with postpartum mood episodes (depressive, manic, or mixed) are at risk for psychotic features, which occur in 1 in 500 to 1 in 1,000 deliveries. These symptoms may range from mild to life threatening for the mother and the infant.[6] The recurrence rate for peripartum depression is 50%. The relapse rate for women with bipolar mood disorder is 30%-50% in the peripartum period. Women with a history of peripartum psychosis have a 70% chance of recurrence.[7]

Risk factors for perinatal depression include previous depression, especially postpartum depression, and depressive symptoms during pregnancy, including anxiety, life stress, lack of social support, being a single parent, younger age, experience of domestic violence, unintended pregnancy, and lower socioeconomic status.[8-10] Depression and anxiety during pregnancy and the postpartum period predisposes mothers to the following complications: low maternal weight gain and decreased fetal growth,

increased incidence of preterm delivery, preeclampsia, postnatal complications, and decrease in vaginal deliveries. There is an increased risk of suicide, substance abuse, recurrent or longer depressive episodes, and increased healthcare costs.[11,12,4]

Infants and children born to mothers with perinatal depression face increased likelihood of complications such as low birth weight and poor weight gain, sleep dysfunction, decreased breastfeeding, poor attachment, and infanticide. Longer term outcomes include delays in language and social development and worse long-term mental health outcomes.[13-15]

Assessment

Screening women for perinatal mood and anxiety symptoms across a variety of settings is critical for increasing identification and treatment. The Edinburgh Postnatal Depression Scale is the most commonly used and evidence-based tool used to screen for depression. Developed by Cox, Holden & Sagovsky,[16] the EPDS was designed to allow screening of postnatal depression in the primary care setting. It is recommended that routine administration of the EPDS take place at least between 6-8 weeks postpartum and again between 3-6 months postpartum,[17] and with ongoing screening through 12 months postpartum being useful. Although the EPDS was originally intended to screen for depression in the postpartum period, it has more recently been validated for use in screening for antenatal depression as well.[18] When used to screen for antenatal depression, it is recommended that a higher cut-off (15 or more as compared to 13 or more for postpartum depression) be utilized. It is suggested that the total score provides a distinctly accurate indication of the likelihood of clinical depression across numerous cultures and countries. As this measure became widely used (and misused), the original authors of the scale more recently published a book to ensure proper implementation of the screening tool.[19]

In addition to identifying depression and anxiety in the perinatal period, it is also critical to screen for bipolar disorder. Most women with bipolar disorder will experience a mood episode during pregnancy and the postpartum period (as high as 60%-70% in recent studies).[20,21] Women with bipolar disorder are also at risk for developing postpartum mania and psychosis, with estimates ranging from 25%-50%. Onset is usually within 3 weeks of delivery.[22-24] Recommendations include screening for bipolar disorder in women who present with depressive symptoms during the prenatal period and postpartum. This is especially important when considering prescribing an antidepressant, given the risk of inducing mania or hypomania if an underlying bipolar disorder is not identified. Women with a previous postpartum episode are at greater risk for developing bipolar disorder. The Mood Disorder Questionnaire (MDQ), a brief measure that has been studied across primary care settings, has been recommended in a recent review of screening instruments for bipolar disorder in the perinatal period. It is suggested to screen at the first prenatal visit, within the first few days postpartum, at 4-6 weeks postpartum, and at any point that a woman presents with depressive symptoms during the perinatal period.[25]

My Mood Monitor (M3) is a screening tool for depression, anxiety (including OCD and PSTD), and bipolar disorder that has also been used in the primary care population.[26] Additional questions specifically addressing postpartum depression and anxiety have been added. Validation studies are underway in adolescent pregnancy, also.

Given the long term implications of depression on the mother-infant relationship, evidence-based measures have also been developed to assess this area. Two examples include the Working Model of the Child Interview (WMCI), and the Early Relational Assessment (ERA) videotaped parent-child interaction evaluation.[27,28]

Treatment Options: Therapy

Similar to depression outside of the perinatal period, a variety of therapeutic modalities may be helpful. A 2008 meta-analysis concluded that psychotherapeutic interventions provided moderate symptom improvement for women experiencing postpartum depression.[29]

Cognitive Behavioral Therapy (CBT) has been well established in the literature as an effective treatment for depression (see Butler, Chapman, Forman, & Beck[30] for a review). Evidence has been mixed regarding the usefulness of CBT in the perinatal period with some studies suggesting improvement in depressive symptoms over wait-list or standard care controls[31-33] and others suggesting minimal or no advantage for CBT over other psychotherapeutic interventions.[34]

However, in the meta-analysis noted above,[29] CBT with women experiencing postpartum depression was not nearly as effective in reducing symptoms as CBT for those experiencing general depression. More recently, O'Mahen and colleagues[35] have suggested that general CBT may need to be modified to prove most effective for women experiencing perinatal depression. They suggest the importance of focus on negative thoughts, behavioral impact and resiliency, efficacy, and coping specifically within the contexts of the domain of motherhood, the interpersonal domain, and the domain of the woman's self for utilizing CBT to effectively treat women in the postpartum period.

Individual Interpersonal Therapy (IPT) is currently the most well-validated intervention in the treatment of women experiencing postpartum depression across the spectrum from mild to severe depression.[36,37] Developed in the United States by Weissman and colleagues,[38] Interpersonal Therapy focuses on areas relevant to pregnancy and the birth of a child such as grief, transition, and interpersonal conflict.[39] A recent meta-analysis of a variety of treatment interventions for postpartum depression suggested that interventions incorporating an interpersonal component to be most effective.[40] IPT has been shown to be effective not only in the postpartum period, but also during the antepartum period due to its focus on treating "life-event-based illnesses," both of these periods being major life transitions for women.[41]

Many women feel isolated during the postpartum period, especially if symptoms of anxiety and depression interfere with normal social and occupational functioning. Group therapy can help address the need for peer support, while providing evidence-based treatment for mental health disorders. Group Interpersonal Psychotherapy (IPT-G) is a brief, focused, and manualized approach that places emphasis on the role of attachment style in one's ability to navigate the transition to parenthood; it has been shown to be an effective intervention for women postnatally, resulting in both rapid and sustained reduction in depressive symptoms, as well as gains in interpersonal functioning.[42] IPT in a group setting has also been demonstrated as efficacious in the prevention of postpartum depression when provided to women proactively within the first 3 months postpartum.[43]

The Mother-Infant Therapy Group (MITG) is a manualized group therapy treatment developed for mothers experiencing postpartum depression that utilizes exercises and strategies based in both cognitive-behavioral and interpersonal therapies to treat mother, infant, and the relationship between the two.[44] Research has continued to support the use of a combination of CBT and IPT in groups to reduce symptoms across all group members.[45]

Treatment Options: Medications during Pregnancy

Medication use during pregnancy presents special concerns for the mother and prescribing physician. All psychotropic medications pass through the placenta. The risks of treatment during pregnancy continue to be evaluated and are not fully clear. Most studies of antidepressant use during pregnancy have difficulty controlling for possible effects of depression and other confounding variables. Treatment risks must be balanced with the risk of untreated depression or other mental illness during pregnancy, including risks to the fetus, the infant, and the mother.

Depression and Anxiety

In 2009, the American Psychiatric Association (APA) and the American Congress of Obstetricians and Gynecologists (ACOG) issued a joint report on the management of depression during pregnancy.[4] Treatment algorithms are included for management of major depression (MDD) in preconception planning, and for women with MDD who are pregnant and either on or off medication. A recent article by Linda Chaudron, MD, MS, suggests strategies and considerations to take into account when treating depression before and during pregnancy.[46] Statistics in the following 2 paragraphs are summarized from this review article and the above referenced report by the APA and ACOG. Please see these articles for additional references.

A quantitative review found an association for increased risk of spontaneous abortion in early pregnancy with antidepressant use (relative risk 1.45). The studies evaluated did not control for psychiatric illness state and confounding variables such as health habits, nicotine and drug use, and age. Both depression and antidepressant use may have some association with fetal growth changes and shorter gestations. No specific pattern of fetal malformations has been associated with depression or antidepressant use.

Some database reports showed increased risk of cardiac malformations with paroxetine, while other studies did not find this association. Congenital heart defects may be increased with concurrent use of an SSRI and benzodiazepine.

Short-term neonatal irritability and neurobehavioral changes are also linked with depression and antidepressant use. *Poor neonatal adaptation* occurs in infants of about 15%-30% of women who take SSRIs in late pregnancy. This may include transient symptoms of tachypnea, hypoglycemia, temperature instability, irritability, weak or absent cry, and seizures. Use of SSRIs in the third trimester has been found to increase the absolute risk of persistent pulmonary hypertension from 0.5-2/1000 to 3-6/1000, though subsequent studies did not show an increased risk.

A controlled prospective study of 238 women with either exposure to depression, SSRIs, or no depression or SSRI treatment during pregnancy found no differences between the groups in minor physical anomalies, maternal weight gain, birth weight, and neonatal outcomes (except for a small difference in 5-minute Apgar scores). Continuous exposure to SSRIs or untreated depression during pregnancy were each associated with higher preterm birth rates.[47]

Psychotherapy alone is recommended when appropriate, but may not be available to all women, and some women may prefer or need pharmacotherapy to adequately treat depressive symptoms. ECT has been regarded as safe and effective during pregnancy for severe depression.[4]

Discontinuing antidepressants during pregnancy must be considered carefully. In one study, relapse rates among euthymic women with a history of depression who discontinued antidepressants during pregnancy were significantly higher than those who continued antidepressant medication (68% vs 26% relapse rate).[48]

Bipolar Disorder and Psychosis

Treatment of bipolar disorder presents challenges, as many mood stabilizers are also known teratogens. Although pregnancy was historically thought to have a protective effect for mood episodes, a prospective study of pregnant women with bipolar disorder who discontinued mood stabilizers had a recurrence rate of 85% vs 37% in those who continued mood stabilizers. Overall risk of recurrence was 71%, usually early in the pregnancy.[21] Preconception planning is ideal for helping women with bipolar disorder decide on the best course of treatment during pregnancy.

Lithium was previously believed to cause significant cardiac malformations (ie, Ebstein's Anomaly). More recent studies have suggested the risk is lower than previous estimates (1/2000 vs 1/1000 previously estimated). Lithium levels should be monitored closely, as higher doses are needed during pregnancy due to increased clearance with increased blood volume, Glomerular Filtration Rate (GFR), and other changes during pregnancy. The dose may be held for 24-48 hours before delivery, or decreased to pre-pregnancy doses in the immediate postpartum period.[7,49]

Lamotrigine is a good option for maintenance and bipolar depression treatment during pregnancy due to its relative safety compared with other anticonvulsants. There is a small risk of cleft lip/palate with first trimester exposure, with a prevalence of 9 per 1000. Due to increases in the clearance of lamotrigine during pregnancy, higher doses are needed to maintain therapeutic effect. Close monitoring in the postpartum is also necessary, as the dose must be decreased rapidly to avoid toxicity.[50]

Valproic acid, when taken during pregnancy, increases the risk of cardiac, oral clefts, urologic, skeletal, neural tube, and behavioral defects (lower IQ), and should not be the drug of choice in women of childbearing age. Carbamazepine has similar risks for neural tube defects.[7] Other anticonvulsants, including gabapentin, oxcarbazepine, and topirimate, raise concerns for use during pregnancy, though are considered less risky than valproate.

Haloperidol, or other first-generation antipsychotics, have been historically the conventional treatment of choice for pregnant women with bipolar disorder or psychosis. With the increase in the use of atypical antipsychotics for bipolar disorder and psychotic illnesses, naturally more pregnant women have been taking these medications at conception or during pregnancy. There are no known major congenital malformations associated with first or second generation (atypical) antipsychotics, though safety data is limited.[51,7]

Withdrawal dyskinesias have been noted in newborns. The FDA issued a warning about abnormal muscle movements and withdrawal symptoms in

newborns associated with atypical antipsychotics.[49,52] However, the cases used as the basis for the warning included use of confounding drugs (benzodiazepines, non-benzodiazepine hypnotics, opioids, antidepressants), which may also cause similar withdrawal symptoms and other complications.

Pregnant women taking atypical antipsychotics are more likely to develop gestational diabetes and deliver larger babies.[53,54] Another study found that women taking second generation antipsychotics had a higher incidence of large for gestational age infants than the reference group, not on antipsychotic medication. Women taking first-generation antipsychotics had a higher incidence of small for gestational age infants than the reference group.[55] Long-term risks for problems with glucose metabolism in babies exposed in utero is unknown.

Given these results, consideration should be given to using first-generation antipsychotics in pregnancy. However, when a woman becomes pregnant who is taking an effective antipsychotic, continuation of the current medication is preferred.[53] Similar to other psychotropic medications during pregnancy, abrupt discontinuation of antipsychotic medication is not recommended, as this can cause severe withdrawal symptoms, and worsening of psychosis or mood symptoms.[56]

Drug registries have been established to help systematically collect data on maternal and fetal outcomes for medication classes used in the treatment of bipolar disorder. The National Pregnancy Registry for Atypical Antipsychotics (http://www.womensmentalhealth.org/pregnancyregistry) collects data on atypical antipsychotics, and the North American Antiepileptic Drug Pregnancy Registry (http://www.aedpregnancyregistry.org) collects data on antiepileptics.

Treatment Options: Medications During Postpartum and Breastfeeding

Although postpartum depression is common, there have not been many studies systematically assessing the efficacy of pharmacologic treatments.[7] There has been one randomized controlled trial of 1 or 6 sessions of CBT, plus fluoxetine or placebo.[57] Short-term (6 session) CBT or fluoxetine were shown to be equally effective over 3 months. Antidepressants, such as sertraline, fluoxetine, and venlafaxine, have been shown to be effective and well tolerated in postpartum depression at standard doses. Choice of antidepressant is based on past response and side effect profile. SSRIs are generally first line, but bupropion, SNRIs, and TCAs are also frequently used.[7] Benzodiazepines, such as clonazepam and lorazepam, are commonly used to treat the anxiety that is often present with postpartum depression.

Although hormonal therapies have been considered in postpartum depression, there is no clear evidence to support the use of progesterone or estrogen for treatment of depression in the perinatal period, especially given risks such as decreased milk production and thromboembolic events. Antidepressants remain the treatment of choice.[7]

Treatment of Depression and Anxiety during Breastfeeding

Mothers and treatment providers commonly face decisions about taking medications while breastfeeding. Evidence supports continuation of an effective antidepressant that the mother has taken during pregnancy, or resuming a specific antidepressant that has been helpful in the past.[58] The use of the relative infant dose calculation is a general guideline for safety of medications during breastfeeding. A relative infant dose via breast milk of less than 10% of the maternal weight adjusted dose is generally considered safe. Most antidepressants, including SSRIs, SNRIs, and tricyclic antidepressants, are excreted at low doses into breast milk and are generally below the 10% threshold for relative infant dose.[59] Sertraline and paroxetine have the lowest relative infant doses among the SSRIs. One pooled analysis of 57 studies showed that sertraline, paroxetine, and nortryptyline were undetectable in over 200 infants tested. Other antidepressants were detected at low levels in some infants.[60] There have been case series and reports of possible side effects in the infants of mothers taking antidepressants, including sleep problems, irritability, poor feeding, and drowsiness (which can be subtle, and not specifically caused by the medication). These are most often reported with fluoxetine, in part due to the large number of women who have taken this medication, and also citalopram. However, discontinuing these medications is not recommended if they are effective. Infants can be monitored by the mother and health care provider for any subtle changes or

side effects. Premature infants, or those with impaired metabolism, may need additional monitoring. Benzodiazepines are generally considered safe during breastfeeding.[61]

Serious adverse events while taking antidepressants have generally not been reported. Less is known about long-term effects of exposure to antidepressants through breastfeeding. However, the low or undetectable levels of antidepressants in asymptomatic infants, as well as antenatal studies that suggest little or no adverse effects from antidepressant exposure, can be somewhat reassuring. Mothers should be informed that our understanding of long-term effects is still evolving, but based on current evidence, antidepressants are a reasonable choice, especially given the risks of untreated postpartum depression.[62,60]

Treatment of Bipolar Disorder and Psychosis during Breastfeeding

Divergent from the recommendations during pregnancy, anticonvulsants, such as valproic acid and carbamazepine, are generally considered safe during breastfeeding. There is less data on oxcarbazepine and topirimate while breastfeeding.[63]

Lamictal has been evaluated by 6 studies and case reports during breastfeeding, with no adverse events reported in the infants. Drug levels in the infants were between 25%-30% of the maternal dose, however, no adverse events were reported.[54] Monitoring for side effects, especially Steven's Johnson Syndrome, is important, though no cases have been reported in infants exposed through breast milk.

Lithium is excreted into breast milk at up to 40% of maternal levels, and previously was considered contraindicated with breastfeeding. However, infants may be breastfed while their lithium levels are monitored—and kept much lower than therapeutic levels—and the infant is not showing any signs of toxicity.[64]

Based on limited data on antipsychotic medications, it is difficult to draw conclusions about safety for breastfeeding infants. Of the atypical antipsychotics, some data exists for risperidone and quetiapine that does not suggest likelihood of adverse events. Adverse events have occurred with olanzapine (extrapyramidal symptoms) and clozapine (hematologic complications), therefore breastfeeding is not recommended on these 2 medications.[65] There is no data for aripiprazole, ziprasidone, lurasidone, or paliperidone. A more recent review suggested that olanzapine and quetiapine were acceptable for breastfeeding, whereas others, such as risperidone, chlorpromazine, and haloperidol could be considered for breastfeeding with medical supervision.[66] These conflicting recommendations highlight the difficulty in studying efficacy and safety in this population, as well as the need for individualized risk-benefit discussions with patients during the peripartum period.

Resources for Pregnancy Related Depression and Medication Use

Resources have been created to provide information to women about pregnancy-related depression, use of antidepressants during the perinatal period, and evidence-based recommendations regarding use of medications during breastfeeding. Specifically, the Mother Risk website has evidence-based recommendations and resources regarding medications during breastfeeding (http://www.motherisk.org/women/breastfeeding.jsp), the Wisconsin Association for Perinatal Care website provides a concise summary of antidepressant medication use in the perinatal period (http://store.perinatalweb.org/index.php?route=product/product&product_id=56), and Heath Team Works in affiliation with the Colorado Department of Public Health and Environment has developed a Clinical Guideline and patient handout about pregnancy-related depression (http://www.healthteamworks.org/guidelines/prd.html).

Adolescent Mothers

The rate of teen pregnancy in the United States far outdistances the rates in other Western, industrialized nations. Despite the similar prevalence of sexual intercourse, the increased pregnancy rate in the U.S. is likely due to the significantly lower rate of contraceptive use among American adolescents. Over 7% of adolescent girls become pregnant each year and over 4% go on to deliver babies. There are significant differences in ethnicity and poverty level among adolescent mothers, with poor, ethnic minority adolescent girls being overrepresented within the adolescent mother population.[67]

There are multiple predictors for adolescent motherhood that also have important psychological and

psychiatric implications.[68-70] These include aggression, substance abuse, conduct disorder, lack of academic goals, childhood sexual abuse,[71] anxiety, and mood disorders.[72] Adolescent motherhood itself is associated with its own difficulties, which include poverty,[73,74] low educational achievement,[75,76] and rapid-repeat pregnancy.[77] Children of adolescent mothers are at greater risk for a variety of negative outcomes, including academic delays and school problems, behavior problems, and becoming adolescent parents.[78,79,73] In addition to the above risk factors and psychosocial issues, postpartum depression has been specifically recognized as having a deleterious impact on both mother and baby.[80-83] Multiple studies suggest that adolescent mothers have almost twice the rate of depression as adult mothers and that their depressive symptoms last significantly longer.[84-86] Depression during the postpartum period impacts infant care, creates more negative interactions between mother and baby, and makes it more difficult for mothers to engage with their babies when babies have negative responses such as crying.[87,88] Additionally, depression in the postpartum period put babies at higher risk for abuse.[89]

Assessment

The Edinburgh PostNatal Depression Scale (EPDS) and Center for Epidemiologic Studies Depression Scale (CES-D) are the 2 measures with the most evidence for assessing postpartum depression in adolescent mothers.[90] There are no clinical assessment measures specifically recommended for general issues in working with adolescent mothers. Therefore, clinical interviews with the patient and family members, if possible, in addition to standard adolescent measures for anxiety (State-Trait Anxiety Inventory), trauma (Trauma Symptom Checklist), and bipolar mood disorder (Mood Disorder Questionnaire) are advised. Additionally, there are measures used to assess the quality of the relationship between mother and baby, such as the Working Model of the Child Interview and Crowell Procedures. However, these have not been validated with adolescent mothers.

Evidenced-Based/Informed Treatments

Multiple studies demonstrate the effectiveness of cognitive behavioral therapy, interpersonal therapy, and psychopharmacology in treating postpartum depression in adult mothers.[90] However, there is a paucity of literature on treatment of pregnancy-related depression in adolescents. Using interpersonal therapy, Miller and colleagues conducted a 12-week group with depressed pregnant adolescents.[91] Symptoms improved, and this improvement was maintained in the postpartum period. This is the only evidence-based intervention for this population found in the literature.

Infancy and Early Childhood

Critical periods in development continue past the prenatal and infancy periods into early childhood. Factors contributing to the development of lifelong mental and physical health problems include the concept of *toxic stress*. As defined by the National Scientific Council on the Developing Child, toxic stress is a "strong, frequent, and/or prolonged activation of the body's stress-response systems in the absence of the buffering protection of adult support."[92] That adult support is especially critical during the first several years of life. There is evidence that elevated maternal cortisol and psychosocial stress during pregnancy contributes to an increase infant physiological and behavioral responses to stress.[93] Response to separation-reunion stress (using Ainsworth's Strange Situation) was elevated in 17-month olds whose mothers had elevated cortisol in amniotic fluid during pregnancy.[94] These effects can extend beyond infancy, as demonstrated in a study that showed increased rates of anxiety and depression in children ages 6-8 years when mothers had increased levels of cortisol prenatally.[95]

A study of Adverse Childhood Events (ACE), including childhood emotional, physical, or sexual abuse, domestic violence, parental mental illness, and substance abuse in nearly 10,000 patients presenting for routine medical care, demonstrated a strong graded relationship between the number of events that a person was exposed to and adult health risk behaviors and chronic diseases, several of which are the leading causes of death in adults.[1] For those with greater than 4 exposures, there was a 4 to 12-fold increased risk of alcoholism, drug abuse, depression, and suicide attempts over those who had no exposures to childhood adverse events. As summarized in a report for the American Academy of Pediatrics, Shonkoff and colleagues state, "Advances in neuroscience, molecular biology, and genomics have converged on 3

compelling conclusions: (1) early experiences are built into our bodies, (2) significant adversity can produce physiologic disruptions or biological memories that undermine the development of the body's stress response systems and affect the developing brain, cardiovascular system, immune system, and metabolic regulatory controls, and (3) these physiologic disruptions can persist far into adulthood and lead to lifelong impairments in both physical and mental health."[96] One mediator of these effects may be the parent-child attachment relationship, which can be impaired in many of the situations classified as ACEs above. A prospective longitudinal study was recently published examining the relationship between attachment classification in infancy and physical health outcomes 30 years later. Results showed that insecure attachment at both ages 12 and 18 months predicted a 4-fold increase in reporting of inflammation-related and general physical illnesses at age 32 years.[97]

In addition to maternal mental illness and prenatal stress, there is also evidence that the father's mental health and stress levels have significant impact on infant and child outcomes. Paternal depression prenatally is a predictor of infant crying behavior.[98] Additionally, men and teen boys are more dangerous to babies in regards to frequency of shaken baby syndrome.[99] The importance of paternal involvement and well-being are critical to address during this period.

Families bring infants, toddlers, and young children in for evaluations for problems in a variety of areas including emotional, behavioral, relational, or developmental difficulties.[100] Infants (0-12 months of age) are most often seen for problems related to the dysregulation of physiological functioning, including fussy or colicky behavior, feeding, sleeping, and failure to thrive. Toddlers (12-36 months of age) and young children (ages 3-5 years), are often referred for behavioral disturbances, including aggression, defiance, impulsivity, over-activity. Other reasons for referrals to mental health providers may include constitutional issues, such as developmental delays, subtle physiologic, sensory, and sensory-motor processing problems. Discrepancies between the child's temperament and parents expectations can lead to relationship difficulties (eg, "goodness of fit"), which may also precipitate a referral. Concerns about neglect, physical, or sexual abuse of the child often also necessitate involvement of mental health professionals.

Assessment

Assessment of the child and family should have an orientation toward prevention of psychopathology and developing with the families a shared understanding of the core concerns that led to the presentation. Because infants and toddlers are dependent upon their parents and other caregivers, these caregivers are an integral part of the assessment process and the treatment plan. Multidimensional perspectives should be included during the assessment including developmental, relationship and attachment, and borrowing from pediatrics, developmental psychology, speech/language therapy, occupational therapy, and physical therapy.

Multiple assessments are needed over time, given the rapid pace of development and change in response to internal and external stressors of children in this age group. Observation in multiple settings and with different caregivers is ideal. In addition to essential information from parents and primary caregivers, current and past functioning should be assessed from other sources familiar with the child, such as child care providers, foster parents, caseworkers, and medical providers.[100] The Infant-Toddler Mental Status Exam (ITMSE) may be used as a guide for translating categories of the traditional examination of adults and older children to be applicable to the observation of infants and young children. This is a way to assess the developmental, social, and emotional functioning of the child, including interactions with caregivers and an unfamiliar adult.[100]

In addition to a family interview and observation during free play and a structured activity, standardized assessments are available for this age group. These include the ITSEA (Infant-Toddler Social and Emotional Assessment), Brief-ITSEA,[101,102] and the ASQ-SE (Ages and States Questionnaire: Social and Emotional).[103] Full references and further details of each instrument are available in the AACAP Practice Parameter[100] Bayley Scales of Infant Development III, Child Behavior Checklist (CBCL), Vineland Adaptive Behavior Scales, Home Observation for Measurement of Environment, Parent-Child Early Relational Assessment, and Parenting Stress Index.

The Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood (DC:0-3R) was developed by Zero to Three and infant mental health experts in 1994, and revised in

2005. DC:0-3R is the standard for making diagnoses in young children in a developmentally sensitive way that takes into account the impact of early relationships and the caregiving environment.[104]

Evidenced-Based/Informed Treatments: Individual and Group Therapy

There are several therapy modalities that have evidence to support efficacy for a variety of behavioral and emotional problems in early childhood. In addition to those described below, a recent review article highlights other therapies with evidence for use in infants and young children, including CBT, Trauma Focused- CBT, and Circles of Security.[105]

Child Parent Psychotherapy (CPP) is a relationship-based, manualized therapy that was developed to target the sequelae of trauma in young children and their caregivers. CPP integrates theories and modalities from psychodynamic, attachment, trauma, cognitive–behavioral, and social learning theories. Six therapeutic modalities are implemented with a focus on "legitimizing the affective experience and promoting a sense of competence in both the parent and the child."[106] These 6 intervention strategies are: (1) promoting developmental progress through play, physical contact, and language; (2) offering unstructured reflective developmental guidance; (3) modeling appropriate protective behavior; (4) interpreting feelings and actions; (5) providing emotional support and empathic communication; and (6) offering crisis intervention, case management, and concrete assistance with problems of living. The parent/caregiver and child are present for weekly sessions, with additional individual parent sessions as needed. There is a focus on strengthening the dyadic relationship while helping the child and parent develop a joint narrative of the traumatic events. The duration is generally 1 year, though can be flexible based on the circumstances and needs of the family.

Initial and follow-up studies have shown strong evidence for CPP in treating the symptoms and behavioral issues related to PTSD. A randomized, controlled trial with 75 participants assigned to CPP or monthly case management showed significant decreases in total behavioral problems on the CBCL and DC 0-3 Traumatic Stress Disorder symptoms. There was also a significant decrease in maternal symptoms of avoidance.[106] A 6-month follow up study of the same participants demonstrated lasting effects for CPP in significantly decreasing the CBCL Total Behavior Problem score, and maternal symptoms, as measured by the Global Severity Index.[107] In addition, a subsequent analysis showed that children with multiple trauma exposures had very significant reductions in PTSD and depression symptoms, with CPP vs case management, as did the mothers.[108] A randomized preventative study of maltreated infants at 13 months old demonstrated that those whose families who received CPP or a psychoeducational parenting intervention, had similar levels of morning cortisol as those in a non-maltreated infant control group. The divergence in cortisol levels of those in treatment vs those with standard community services arose at mid-intervention, and was sustained through 38 months of age (1 year post-intervention follow up). These results demonstrate the importance and efficacy that early intervention in childhood maltreatment can normalize a biological mediator of adverse child events and toxic stress.[109]

Parent-Child Interaction Therapy (PCIT) is a manualized dyadic behavioral intervention intended for children between the ages of 2 and 7 years with disruptive behaviors along with their caregivers. Treatment focused on decreasing externalizing behavior problems and increasing social skills in the child through coaching parents to utilize child-directed play as a social reinforcer for positive child behavior as well as behavior management techniques in response to negative child behavior.[110] PCIT is implemented through 2 successive components of treatment: (1) Child-Directed Interaction (CDI), and (2) Parent-Directed Interaction (PDI). In CDI, the parent is taught how to follow the child's lead in play via bug-in-the-ear coaching by a therapist observing the parent-child interaction through a one-way mirror. The purpose of this first component of treatment is to support the parent in developing positive communication with their child by giving the child attention following positive behavior and ignoring negative behavior. Daily 5-minute child-directed parent-child play interaction is also assigned as homework during this component of the treatment. After the parent has mastered CDI skills, the parent-child dyad transitions into the second component of PCIT (ie, PDI) together. In PDI, the parent is taught how to effectively manage the child's behavior (again via bug-in-the-ear coaching by a therapist observing the parent-child interaction through

a one-way mirror) through giving clear commands or instructions, followed by praise when the child obeys, and a time-out procedure when the child disobeys. PCIT can be delivered individually or in a group format, is time-unlimited, and materials are available in both English and Spanish.

PCIT is an Evidence-Based Treatment with research indicating more effective parenting skills (ie, higher levels of praise, lower levels of criticism, increased ability to manage challenging behaviors) and significantly improved child behavior (eg, increased compliance and decreased externalizing) over time.[110-112] Even those dyads who participated in an abbreviated version of PCIT seemed to benefit from an increase in parental skills and decrease in oppositional behavior.[113] PCIT has also been shown to be useful with families who are most at risk. A recent study by Chaffin and colleagues[114] demonstrated PCIT as an effective intervention for child welfare-involved families, many with a history of having had their children removed prior to treatment.

The Incredible Years (IY) is a series of manualized, developmentally-informed, group curricula intended for children ages 0-13 years old who are displaying behavior problems along with their parents and teachers. It consists of 3 separate, but coordinated curricula: (1) for the parent, (2) for the teacher, and (3) for the child. The parent-focused curriculum consists of the BASIC parent training program, aimed at increasing parenting skills of those whose children are displaying oppositional or disruptive behavior problems, and the ADVANCE parent training program, addressing interpersonal skills of parents.[115] The Teacher Training Intervention is intended to increase teacher competencies as related to classroom conduct issues and promote the strengthening of home-school connections.[116] The IY Child Training Intervention (*Dinosaur School*) is a group-based intervention intended to teach children ages 3-8 years old problem-solving and social skills.[117]

The IY Parent Training program is the core of the intervention. The ADVANCE parent training program is recommended as a supplemental intervention for dyads in which parental personal and interpersonal (eg, parental mental illness, environmental stressors, etc) impact parenting behavior and parent-child interactions. The BASIC training program focuses on promoting positive parent-child relationships, helping parents learn how to set up predictable and consistent rules and routines, teaching specific nonviolent discipline techniques, and supporting parents in teaching their children problem-solving skills.[118] Homework activities are assigned to reinforce skills learned in group. The BASIC program has recently been divided into age-based categories: infant (0-1 year), toddler (1-3 years), preschool (3-6 years), and school age (6-13 years). A strong evidence base exists for IY intervention with children ages 4 through 8 years old, and a research base is still being developed for the younger and older ends of the age spectrum.[119] Studies indicated that IY Parent Training is not only effective in the short-term, but also gains in parenting skills and reduction in conduct-related child behavior seem to be sustainable at least into adolescence.[118]

Evidenced-Based/Informed Treatments: Medications

The American Academy of Child and Adolescent Psychiatry published guidelines on the Psychopharmacological Treatment of Very Young Children in 2007.[120] This includes algorithms for assessment and treatment of disorders seen in preschoolers, including ADHD, disruptive behavior disorders, major depression, bipolar disorder, anxiety, OCD, pervasive developmental disorders, and primary sleep disorders. A trial of psychotherapy is always recommended prior to initiating psychopharmacology, as evidence for using medications in preschool children is limited in most cases. The Preschool ADHD Treatment Study (PATS) was an NIMH-funded, 6-center, randomized controlled trial which demonstrated safety, tolerability, and efficacy for the use of methylphenidate in preschool children with ADHD.[121,122] Effect sizes were lower than in older children taking methylphenidate for ADHD. Amphetamine formulations have an FDA indication for children ages 3-5 years for ADHD, however this is not supported by a randomized controlled trial. Risperidone has shown efficacy in preschool populations with autism spectrum disorder in 2 randomized controlled trials with 24 children ages 2.5-6, and 39 children ages 2-6.[123,124] Other recommendations discussed in the guideline are supported by open-label studies, retrospective chart reviews, case reports, and extrapolation of evidence from studies in older children. It is important for clinicians to balance the risks and benefits of medications with the risks of not treating in difficult cases that are not responding to psychotherapeutic interventions, placing young

children at increased risk for impaired family and peer relationships, high risk behaviors, and future mental health problems.[100]

Conclusion

Although significant challenges and uncertainties exist in the evaluation and treatment of patients during the perinatal and early childhood period, evidence supports screening and timely treatment for perinatal and early childhood mood, anxiety, and other psychiatric disorders. As a result, further development of innovative programs across disciplines will enhance identification and treatment for teen and adult mothers at-risk for perinatal mental health problems. Given the potential for significant long-term impacts of postpartum depression on the parent-child relationship, it is critical to provide multiple opportunities for early intervention. For example, the recognition of the lasting effects of toxic stress in infancy and early childhood allows for interventions to have high return on the investment of time, effort, and funding for treatment. The impact of perinatal depression on the family should be addressed with a continuum of care for mothers, fathers, infants, and young children. As we discussed, several evidence-based therapy treatments exist that can address perinatal mental health symptoms, and ameliorate the effects of trauma, parent-child relationship problems, and psychiatric diagnoses in young children. When medication is indicated, providers and patients should have a thorough discussion of the risks and benefits for the mother, the fetus, infant, and child, including the serious risks of untreated illness.

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Pediatric Emergency Behavioral Health, Suicidal Behavior, and Non-Suicidal Self-Injury

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Emergency Behavioral Health

Over the past decade, emergency departments (EDs) across the country have experienced a dramatic influx of psychiatric patients. Studies have shown that behavioral health emergencies represent nearly 2% of all ED presentations, and to date in 2013, behavioral health emergencies at Children's Hospital Colorado (CHCO) constitute an average of 4.9% of all ED visits, more than twice the national average.[1-3] The reasons for this discrepancy are not entirely clear, as population studies demonstrate higher rates of emergency department pediatric behavioral health visits in the Northeast and Southern parts of the United States; however it is of interest that Colorado ranks 32nd in overall public behavioral health spending and 50th in the number of available inpatient beds, seemingly supporting the conjecture that EDs are becoming the "safety net" for a fragmented, underfunded, and under-resourced behavioral health system in crisis.[4]

The ED behavioral health crisis, as it is experienced from within systems of care, is not only a function of the ever-expanding volume, but also the influx of this high acuity patient population further taxes EDs by their disproportionate consumption of resources. The length of stay of behavioral health patients in the ED far exceeds the average length of stay of non-psychiatric patients; in the CHCO ED, this difference is almost 3 hours. Assessments are time-consuming, as information from multiple collateral sources is often required to complete a comprehensive risk assessment, and the need to admit or transfer a patient to a psychiatric facility (the disposition in nearly 46% of psychiatric patients from the CHCO ED) further prolongs the process. Behavioral health patients presenting to the ED are also at risk for dangerous behaviors, including aggression and attempted elopement, which have been demonstrated to occur in over 20% of ED encounters.[5] These high-risk behaviors often necessitate the use of seclusion, restraint, emergency medications, and intensive monitoring to maintain the safety of the patient, staff, and the environment.

There is agreement across national professional organizations, including the Institute of Medicine, the American Academy of Pediatrics, and the American Academy of Child and Adolescent Psychiatry (AACAP), that models and standards of care are needed to address this burgeoning clinical need.[6-8] However, a recent review of psychiatric emergency care for children and adolescents demonstrates that there is no clear consensus or recommended care for this population.[9] In 2002, the American Psychiatric Association (APA) convened a task force on Psychiatric Emergency Services that conducted a similar review of the adult psychiatric literature. The findings resulted in a comprehensive summary of proposed categorizations and model program descriptions, which included minimum standards of practice for the structure and process of psychiatric emergency services. The task force report included program descriptions that could be implemented in the hospital setting, an expanded description of ambulatory urgent care services, and a comment about telemedicine.[10] Important commonalities that appear to emerge, from both the pediatric and adult psychiatric literature, are the need to clarify definitions of *emergency*, *urgency*, and *crisis*, and that approaches to patient care should start with basic process components of registration, stabilization, evaluation and assessment, disposition, treatment, referral, and fol-

low up. Additionally, of possible use to the pediatric community is the creation of a model curriculum for residency training by the American Association for Emergency Psychiatry (AAEP).[11] The important work of the APA and AAEP has the potential to inform pediatric providers and administrators as we strive to create and implement evidence-based models of care, and train future providers in the management of pediatric behavioral health emergencies.

Patients and families present for emergency room evaluations with a variety of psychiatric crises. Studies that examine demographic and diagnostic characteristics of children and youth report that suicide attempt and non-suicidal self-injury are among the most common presenting problems.[2,5] It is thus important to expand our knowledge about the scope of the problem, factors which place our patients at risk, and available standards for assessment, treatment, and prevention.

Suicidal Behavior in Children and Adolescents

Suicide is the second leading cause of death in the 15-24 year age group, with Colorado ranking seventh in the nation at a rate of 16.7 per 100,000 population. Adolescent males most commonly complete suicide, while adolescent females more commonly attempt. The most common method of suicide completion is by gunshot, followed by suffocation, and poisoning.[12] It is estimated that over 30% of households in Colorado contain firearms, and teenagers that complete suicide by gunshot most often use a firearm that is owned by a family member. Colorado is 1 of only 4 states in the union that has a separate Office of Suicide Prevention, which was created through House Bill 00-1432 in June 2000, with the charge to lead the statewide suicide prevention and intervention efforts.

With the emergence of adolescent suicide as a significant public health concern and the knowledge that 15% to 30% of adolescent suicide attempters re-attempt within a year, it is essential to identify and intervene with adolescents who are high suicide risk.[13,14] Numerous trait and state factors have been identified that elevate the risk for suicide. In addition to the male gender, adolescents are more likely to complete suicide than children. Compared to the statistics for 15-24 year olds in the state cited previously in the under 15 year age group, suicide is the fourth leading cause of death at a rate of 0.7 per 100,000 population.[15] Adolescents with symptoms of psychiatric illness are also at risk for suicide—including depression, impulsive aggression, and hopelessness—with depression being among the most potent risk factors for suicide. Family history of suicide attempts or suicide completion, a history of abuse—especially sexual abuse—or stress in the family system are additional risk factors for suicide. Gay, lesbian, bisexual, and transgender youth are also thought to be at higher risk, as are pediatric patients with a history of substance abuse, suicide attempt, or nonsuicidal self-injury.[16-18]

Nonsuicidal Self-Injury (NSSI) in Children and Adolescents

Children and adolescents with self-harming behavior (both suicidal and nonsuicidal self-injury) are frequently encountered in the ED setting. The prevalence rates for nonsuicidal self-injury are quite variable, but community studies indicate between 13% and 45% of adolescents report engaging in self-injury at some point in their lifetime.[13,14,19,20] In clinical settings it is even higher, at approximately 40%-60%.[21,22] Studies of self-harming behavior are complicated by the variety of terms used to describe the behavior (eg, self-harm, self-mutilation, parasuicidal, self-injury, suicide gesture), and recent attempts have been made to categorize and clarify theses terms.[23] The term *deliberate self-harm* encompasses both suicide attempts (having the intent to die) and nonsuicidal self-injury (NSSI), which is self-injury without the intent to die.

While it may be difficult to distinguish adolescent suicide attempts from NSSI, teenagers who harm themselves without suicide intent are still at high risk for suicide and suicide attempts.[24] Adolescents who engage in NSSI are more likely to have suicidal behavior and vice versa.[25] In one large study, 70% of the adolescents who engaged in NSSI had made at least 1 suicide attempt, and 55% made multiple attempts.[26] A previous suicide attempt is a significant predictor of future suicidal behavior in teenagers, but more recent studies indicate that NSSI is the strongest predictor of future suicide attempts in

depressed adolescents.[26-29] Nonsuicidal and suicidal behaviors may serve distinctly different purposes, with a major function of NSSI being the management of distressing thoughts and emotions, and many teenagers reporting that NSSI helps them to stop suicidal thoughts and avoid suicide attempts.[30-32] As a result, NSSI has been conceptualized as a *morbid form of self-help*.[33]

Characteristics of NSSI include an age of onset between 12 to 14 years. Cutting oneself with a razor or sharp object is the most common method, and forearms, legs, and stomach are the most common locations.[33] In community studies, most adolescents report engaging in NSSI only a few times (< 10 lifetime episodes), whereas inpatient populations report more frequent episodes of self-injury (averaging > 50 episodes in the previous year).[34,35]

The risk of self-injury is increased by any number of general factors that create greater difficulty regulating affective, cognitive, and social experiences. Distal factors might include childhood abuse, whereas proximal factors might include physiological hyperarousal in response to stress.[36]

Screening and Assessment of Suicidal Behavior and NSSI

The frequency of suicidal behavior and nonsuicidal self-injury, and the associated morbidity and mortality, make it incumbent upon psychiatric providers to identify those individuals at risk, and to provide the necessary intervention. In addition, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has included in its National Patient Safety Goals the requirement to "identify patients at risk for suicide."[37] CHCO responded to the JCAHO mandate by reviewing available research and creating a 4-question screening tool, which was inclusive of questions found to be most predictive of suicide risk.[38] As of 2013, screening has been completed in the CHCO emergency room with all patients over the age of 12 years, regardless of presenting problem. Once patients are identified as moderate or high risk for suicide, they are referred to the CHCO Psychiatric Emergency Service (PES) for more comprehensive assessment. While there are a number of suicide assessment tools that are utilized and validated through research, administrators in the CHCO Department of Psychiatry and Behavioral Sciences selected the Columbia Suicide Severity Rating Scale (C-SSRS) for use in the PES, to further stratify risk for suicide in our adolescent patients. The C-SSRS was developed in 2003 by a group of researchers from Columbia University, and was designed to distinguish the domains of suicidal ideation and suicidal behaviors by measuring 4 research-supported constructs including severity of ideation, intensity of ideation, suicidal behavior, and lethality of actual attempts.[39,40] The C-SSRS includes questions about NSSI, and in a 2011 study of depressed adolescents and adults, has demonstrated good sensitivity, specificity, and convergent and divergent validity with other multi-informant suicidal ideation and behaviors scales.[41]

Treatment and Prevention of Suicidal Behavior and NSSI

In a recent analysis of treatment interventions for self-harming and suicidal adolescents, it was noted that there are still no evidence-based psychological or pharmacological treatments for adolescent suicidal behavior or NSSI.[42] Despite the lack of empirically-validated treatments, some treatment approaches, such as managing underlying psychiatric disorders with psychotherapy and consideration of medication interventions, identifying triggers for self-injurious acts, improving family relationships, and developing improved communication and coping skills, are strongly recommended. Given that the highest risk for recurrent suicidal events in adolescents is within 1 to 4 weeks after discharge from the psychiatric hospital or emergency department, coordinating better access and intensity of care at the right time is also strongly recommended. Factors that have been identified as targets for evaluation and intervention in adolescents with self-harm behaviors include the following factors: motivation to change, substance abuse issues, family support, facilitating positive affect, improving peer and social relationships, and healthy sleep. With a significant proportion (30%-50%) of adolescent suicide attempters being non-adherent to treatment, motivational interviewing may be helpful.[42] This was the case in one study of adolescent suicide attempters, where motivational interviewing was helpful in reducing alcohol and substance abuse as well as recurrent suicidal behavior.[43] Family conflict is one of the stronger predictors of suicidal events in teenagers, consistent with the finding that family support

and cohesion are protective against recurrent suicidal behavior.[28] Studies that have shown some focus on improving the quality of the parent-child relationship have shown positive effects on decreasing self-harm and suicidality.[42] Insomnia is one of the strongest predictors of imminent suicide in adults, and sleep problems predict suicidal ideation and self-harm in adolescents,[45] but there are no studies evaluating whether improved sleep will decrease suicidal ideation and self-harm.

Despite the lack of evidence-based treatment interventions for suicide and NSSI, approaches to suicide prevention have recognized importance. The AACAP Practice Parameter for the Assessment and Treatment of Children and Adolescents With Suicidal Behavior was published in 2001, and while much of the content requires updating, the executive summary reviews the importance of media counseling and postvention following youth suicide, which is currently believed to be important in assessment for traumatic response in survivors, and preventing the development of suicide contagion.[46,47] Means Restriction Counseling, an approach to suicide prevention that involves educating parents on the importance of restricting access of their adolescents to lethal means for suicide, has also increasingly received attention, and has been found to effectively alter the storage practices of household firearms.[48] The CHCO PES piloted a quality improvement project in January 2014 that incorporated standardized Means Restriction Education into the discharge process for all adolescent patients that present with a chief complaint of suicidality. Parents not only received education about the importance of safe firearm storage practices, but were also given the option to take a lockbox home for securing household medications.

Conclusion

The management of pediatric behavioral health emergencies continues to be a rapidly-growing clinical need. EDs have become the safety net to a mental health system in crisis, and patients and their families are presenting to EDs with ever-increasing frequency. Improved systems of care, including alternatives to reliance on general ED services for psychiatric crisis and related clinical expertise are needed to support this burgeoning clinical need. While model curricula and processes have been proposed, none have been rigorously studied in the pediatric population. The most common presenting problems are suicide attempt and nonsuicidal self-injury. Evidence-based screening and assessment tools have been developed, as have strategies for suicide prevention, which are currently being utilized in the CHCO ED and throughout the Department of Psychiatry. Approaches to the treatment of suicidality and NSSI are unfortunately lacking. Gaps in knowledge create opportunities for innovation and research, and the CHCO system of care and the University of Colorado are well-positioned to contribute to the expansion of this knowledge base.

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Addressing Cultural Diversity in Children's Mental Health Services

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Introduction and Overview

As the United States becomes increasingly more diverse, it is critical for our health care system to respond to the needs of our culturally-diverse society. This response includes integrating culturally-relevant practices into our health care system,[1,2] including health care provided by mental health practitioners.[3-5] Fortunately, the fields of psychology and psychiatry have attempted to more thoroughly address this issue over the past few decades.[6,7,3] These efforts have sparked significant discussion among mental health practitioners. Many support these efforts,[8-10] but others have raised disagreements.[11,12] These discussions have also highlighted the ways in which our definitions of mental health issues, including diagnostic classifications in the Diagnostic and Statistical Manual (DSM), have failed to adequately incorporate issues of cultural diversity.[13]

Effectively attending to cultural diversity in mental health care is particularly important given the cultural disparities that persist in our health care system.[14-17] It is well known that mental health services are less available and more difficult to access for cultural minorities, making it less likely for these individuals to obtain necessary mental health treatment. Furthermore, individuals from cultural minority populations who are able to access mental health services are more likely to receive lower quality care and have poorer outcomes,[17] suggesting that current mental health services for cultural minorities are not effective.

Also of concern is the fact that cultural minority youth are under-treated with psychotropic medication when it is indicated. However, overall, psychotropic medication is being increasingly prescribed to youth within our country, suggesting that cultural minority youth remain disproportionately under-treated when medication is indicated. Research indicates that there is not a significant variation in pharmacological responses to psychiatric medications among youth of various cultural backgrounds which, again, suggests that differential access to appropriate psychiatric care is the underlying cause for these disparities.[15]

Multiple factors may perpetuate the disparities within the health care system in general, and in mental health care in particular. For example, cultural barriers, such as language, can negatively impact communication between a health care provider and the patient, satisfaction with health care services, and an individual's utilization of needed health care services.[18] Diverse cultural beliefs and values regarding mental health issues are not always reflected in Western health care settings, creating even more barriers for some cultural groups who attempt to obtain treatment.[15] In addition, certain cultural groups, such as African Americans, Latinos, American Indians, and certain Asian American populations (ie, Cambodian, and/or Samoan) are significantly underrepresented among health care professionals.[19] This may create a gap between mental health professionals and diverse children and families in need of treatment.

Given these disparities, it is imperative that mental health practitioners, including psychologists, psychiatrists, and other behavioral health clinicians, actively integrate culturally-informed conceptual frameworks and practices into our clinical services, our research, and the infrastructure of our mental health settings and services. Such efforts will help to

promote the positive well-being of diverse individuals, including children and families. The purpose of this article is to: (1) review the existing literature on culture and cultural competence as it relates to health care, and to mental health care in particular; (2) highlight ways in which cultural diversity can be integrated into clinical practice for children and families; (3) review challenges associated with cultural diversity in research, including evidence-based practices; and (4) offer recommendations for increasing culturally-relevant practices into the professional activities of mental health professionals.

Culture and Cultural Competence

A number of terms and models are present in the scholarship of culture and diversity. Although these various definitions have some commonalities, there are also differences, which can create confusion. Therefore, establishing a shared definition of culture for a particular professional community is a first step to design culturally-relevant services for psychologists and psychiatrists.[5] Kreuter et al write:

> "Although no single definition of culture is universally accepted by social scientists, there is general agreement that culture is learned, shared, and transmitted from one generation to the next, and it can be seen in a group's values, norms, practices, systems of meaning, ways of life, and other social regularities."[2]

For mental health practitioners, it is imperative to emphasize that the definition of culture must encompass multiple cultural variables, including race, ethnicity, socioeconomic status, gender, immigration status, language, sexual orientation, and ability. Wasserman and Flannery[20] also highlight the importance of attending to the social and historical context of cultural groups when defining culture. While some progress for social equity has been made, a history of oppression, racism, and/or discrimination remains for some cultural groups; therefore, it has the potential to continue affecting the experiences of these diverse children and families—including their experiences within the mental health care system.

Various conceptualizations have also been used to describe the efforts that attend to cultural issues, including "cultural sensitivity," "cultural responsiveness," "multicultural competence," "cultural targeting," and "cultural tailoring." While all of these terms attempt to describe a similar effort, *cultural competence* has been advocated as a particularly meaningful conceptualization for mental health practitioners to embrace.[4] Cultural competence, as a concept, highlights the need for practitioners to develop skills for effectively working with diverse individuals, not simply taking an already established area of competence (eg, a particular evidence-based psychotherapy treatment) and applying it from one cultural group to another. Cultural competence has also been defined in multiple ways, and these definitions have similarities as well as differences.[4,5] Whaley and Davis offer a definition of cultural competence that attempts to include major commonalities that are offered from various scholars:

> "…we view cultural competence as a set of problem-solving skills that include (a) the ability to recognize and understand the dynamic interplay between the heritage and adaptation dimensions of culture in shaping human behavior; (b) the ability to use knowledge acquired about an individual's heritage and adaptational challenges to maximize the effectiveness of assessment, diagnosis, and treatment; and (c) internalization (ie, incorporation into one's clinical problem-solving repertoire) of this process of recognition, acquisition, and use of cultural dynamics so that it can be routinely applied to diverse groups.".[5]

Culturally-minded mental health professionals should strive to gain cultural competence to more effectively work with culturally-diverse children and families. In order to do so, these professionals should ascribe to a conceptual framework of cultural competency to guide their practice. This is particularly important given the various ways in which the construct has been defined. The model often referenced includes 3 components that every therapist should possess[3,4]:

1. *Cultural awareness and beliefs*: understanding that one's personal values, biases, and overall worldview may impact the therapeutic relationship.

2. *Cultural knowledge*: understanding about an individual's culture, worldview, and belief system.
3. *Cultural skills*: ability to work with an individual in a manner that is attentive to and respectful of cultural issues.

Psychologists, psychiatrists, and other mental health clinicians should receive on-going training to develop strategies for increasing cultural competency in each of these 3 areas. Training in these areas has been proposed as a strategy for improving overall patient care, reducing errors when providing care, and ultimately reducing the cultural disparities that exist in our health care system.[21]

Integrating Cultural Diversity into Clinical Practice

While the implementation of culturally-competent practices has been promoted as a way to reduce health disparities that exist among culturally-diverse populations,[22] determining exactly what culturally-competent practices should be implemented and how to do so in an effective manner remains challenging. These challenges are impacted by the limited amount of empirical data available regarding cultural competence and cultural issues in mental health practice.[4] As a result, it is difficult to determine what culturally-competent practice looks like, and how to systematically assess the impact of such practices on clinical care for diverse children and families.[22] Fortunately, scholarship addressing these challenges is growing, and a number of topics in the literature serve as a guide for developing mental health services for children and families that attend to issues of cultural diversity.

Using a Bioecological Framework for Approaching Mental Health Treatment

While it is largely understood that culture must be taken into consideration when providing clinical care, culture is often assumed and not fully assessed to inform mental health treatment.[2] Furthermore, while it is important to have knowledge about different cultural groups, it is imperative not to over-generalize this knowledge in a manner that disregards individual variation within cultural groups. Rather, it is important to use a middle-ground approach that recognizes characteristics often typical of cultural groups, while also exploring individual differences.[2] In order to consider cultural characteristics while also attending to the uniqueness of each individual, it is recommended that mental health practitioners use a culturally-appropriate conceptual framework as a starting point—one that allows for effective assessment of cultural issues, conceptualization of patient concerns, and guidance of treatment planning for children and families. Using such a framework is particularly important because practitioners have traditionally conceptualized mental health issues as being a result of individual characteristics, such as behavioral and/or psychological factors. As a result, traditional mental health treatments and theories of psychotherapy often assume the culture of middle-class, European American individuals, thus utilizing a Eurocentric worldview.[23,24] These approaches are often rooted in European American values, such as "optimism, individualism, egalitarianism, glorification of social mobility, and encouragement of personal change."[24] These values may not be congruent with the values that comprise the worldview of each child and his or her family. Some traditional mental health treatments also place a great deal of emphasis on internal factors, and assume that the individual has a high degree of control over change. Furthermore, there is often an assumption that individuals have access to resources and are willing and able to join the mainstream culture.[25] These notions, however, are not necessarily true for all individuals.

A conceptual framework that can be helpful for mental health practitioners striving to provide culturally-competent care is the *bioecological model*, such as that proposed by Bronfenbrenner.[26,27] This model allows for the integration of cultural and contextual factors (eg, ethnicity, social class, race, gender, sexual orientation, language, ability, and immigration status) when assessing the worldview of a child and his or her family, and when developing interventions that attend to these cultural factors. A bioecological framework posits that an individual's behavior and psychological well-being results from the dynamic interactions between the individual and multiple cultural factors, including larger social, institutional, and historical contexts. This framework departs from a deficit model because it conceptualizes that change processes within mental health treatment do not lie solely within the individual, but also within his or her context. Importantly, the bioecological model integrates multicultural practices and recognizes how

one's psychological well-being is highly impacted by one's race, ethnicity, and cultural values, as well as experiences of oppression, privilege, racism, and discrimination.[9,25,28] By applying a bioecological perspective to the delivery of mental health services, we can strive to implement culturally-relevant treatments in order to meet the specific needs of diverse children and families.

Mental health professionals may also want to consider developing a more formalized tool to guide assessments that are consistent with the bioecological framework, such as the Sociocultural Assessment Protocol (SCAP) proposed by Yamada & Brekke.[29] The SCAP assesses for a number of factors that may be impacted by a child or family's culture (eg, social stressors and social support network, life control, change of environment, and/or language/communication). Another useful tool is the Cultural Formulation Interview (CFI) included in the DSM-5. The CFI is a set of 16 questions that mental health providers can use to guide a diagnostic assessment that includes attention to important cultural factors. The CFI includes questions that assess the following areas: one's cultural identity, cultural conceptualization of distress, psychosocial stressors and cultural features of vulnerability and resilience, cultural features of the relationship between the individual and the clinician, and overall cultural assessment. Such tools allow for assessment of culturally-diverse children and families by helping to understand their goals for mental health treatment and their unique cultural experiences that can inform treatment planning.

Cultural Tailoring

Another concept that can be used in conjunction with a bioecological model of practice is "cultural tailoring."[2] This involves recognizing that cultural variables may be salient to an individual, and therefore are important to address when providing culturally-appropriate mental health care. However, individual assessment must also take place to determine how relevant these characteristics are to each individual, which can ideally be completed using the bioecological framework. For example, if an individual's cultural background includes a high value placed on religion, specific individual assessment should take place to examine if and how religion is relevant to the particular individual. Results from this assessment will help to inform case conceptualization and treatment planning. Cultural tailoring allows mental health practitioners to pay particular attention to salient cultural factors that are most important to children and families, and in turn help to develop effective interventions.

Cultural Adaptation

While a significant amount of literature exists about the theoretical underpinnings of culturally-appropriate mental health services, the most effective way to deliver *culturally-adapted* mental health interventions is less clear.[30] Furthermore, although studies support the effectiveness of some mental health treatment in general, such as psychotherapy, this research does not adequately address how various cultural factors play a role in the effectiveness of the psychotherapeutic process.[25,28,31,32] Scholars suggest that existing mental health interventions should be adapted for culturally-diverse individuals. For example, Griner and Smith[30] reviewed the literature and identified 4 common themes about how to deliver mental health interventions using cultural adaptations: (1) actively identifying and integrating the cultural values of the individual into the therapeutic process; (2) when possible, matching individuals with mental health clinicians that have similar cultural characteristics (eg, race, ethnicity, orlanguage); (3) providing mental health interventions in a manner that is accessible and readily available for culturally-diverse individuals (eg, offering community mental health services directly within the neighborhood of a particular cultural group); and (4) including supportive individuals and resources that are important to the individual and his/her cultural background (eg, extended family members, or religious/spiritual leaders).

Following their review of the literature, Griner and Smith conducted a meta-analysis of 76 culturally-adapted mental health interventions to determine the effectiveness of these treatments. Empirical studies were included in the meta-analysis under the following guideline: "The manuscript had to explicitly state that the adaptations were based on culture, ethnicity, or race."[30] Results from this meta-analysis identified an average effect size of .45 across studies (d=.45, SE=.04, p<.0001), suggesting a moderately strong benefit for these types of interventions. Furthermore, mental health interventions delivered to specific cultural groups were 4 times more effective than those

interventions provided to groups of individuals from differing cultural backgrounds. Griner and Smith[30] also reported that when interventions were delivered to non-native English speakers in an individual's native language, they were 2 times as effective as interventions delivered in English. Other research has demonstrated that language-based interventions (eg, oral interpretation) are related to better patient experiences, improved patient comprehension, and more appropriate use of health care services.[18] These findings provide some insight into the ways in which mental health interventions can be effectively adapted for culturally-diverse individuals.

In an effort to look more closely at evidence-based treatments for culturally-diverse youth in particular (individuals ages 18 and younger), Huey and Polo reviewed 25 available research studies relevant to mental health care. They applied the definition of *treatment* as defined by Weisz and Weiss (1995): "'any intervention to alleviate psychological distress, reduce maladaptive behavior, or enhance adaptive behavior through counseling, structured or unstructured interaction, a training program, or a predetermined treatment plan,'"[33] Results from Huey and Polo's meta-analysis suggest a moderate benefit of these interventions (d=.44, SE=.06, p<.01). They concluded that there were no well-established treatments in their review, but they did identify *probably efficacious* and *possibly efficacious* treatments for ethnic minority youth with anxiety problems, attention-deficit/hyperactivity disorder, depression, conduct problems, substance use problems, trauma, and other clinical problems. Based upon this review, cognitive-behavioral treatments demonstrated the most positive outcomes with ethnic minority youth in general. Furthermore, certain therapeutic treatments were identified as more effective for particular cultural groups. For example, using cognitive behavioral therapy or interpersonal process therapy may be more effective for depressed Latino youth than other types of treatment. Family systems treatments, including Brief Strategic Family Therapy, Multidimensional Family Therapy, and Multisystemic Therapy appear effective for culturally-diverse youth with conduct and drug-related problems.

While many psychotherapy interventions attempt to include cultural adaptations, there is limited empirical evidence to date that demonstrates if and how these adaptations actually improve psychotherapy outcomes.[33] Despite this, evidence from the broader literature maintains that culturally-competent treatment interventions are valuable and needed.[4] As a general guideline, it appears that certain psychological theories are broadly applicable to human behavior and emotional functioning. However, we need to consider these universal theories using a culturally-specific lens, and effectively adapt interventions to provide culturally-diverse individuals with quality mental health treatment.[34] Additional research is needed to better understand the impact of cultural modifications.

Cultural Leverage

Another useful conceptualization for translating multicultural principles into action is *cultural leverage*. This concept is particularly useful for mental health professionals in the health care setting, and has been described as:

> "…a focused strategy for improving the health of racial and ethnic communities by using their cultural practices, products, philosophies, or environments as vehicles that facilitate behavior change of patients and practitioners. Building on prior strategies, cultural leverage proactively identifies the areas in which a cultural intervention can improve behaviors and then actively implements the solution. Cultural leverage is a process whereby the principles of cultural competence are deliberately invoked to develop interventions; it has the potential to operate at multiple levels throughout the health care delivery process. As we consider individuals, their communities and the means by which they access the health care environment, culture becomes central: factors such as language, family norms, and sexuality shape the framework through which health care is accessed."[14]

Fischer and colleagues[14] applied their conceptualization of cultural leverage to determine its impact on decreasing health disparities. Multiple health care providers, including nurses, counselors, and community health care workers delivered health information in culturally-relevant ways. The interventions utilized in these studies integrated cultural factors into the following types of interventions: (1) changing health behaviors of individuals within communities, (2)

increasing access to mental health services/systems, and (3) making changes within health care systems to improve services provided for racial/ethnic minority patients. Results from this review suggest that these interventions show promise for reducing cultural disparities that exist in our health care system by increasing patients' knowledge for self-care, reducing barriers to receiving health care services, and increasing the cultural competence of health care providers.

Given the promising results regarding the potential benefit of strategies based on the concept of cultural leverage, it is important to consider how these strategies might be translated to mental health interventions for children and families in particular. When doing so, it is important to consider how strategies grounded in cultural leverage can be used in combination with "generic" health care strategies to optimize efforts.[14] It is not necessarily the case that one set of strategies should be used over the other, but rather they should be used in combination. For example, when working with a particular child and family in need of mental health services, the following strategies may be used: community outreach to identify culturally-relevant mental health resources (cultural leverage strategy), providing information regarding mental health care using language that fits within the cultural worldview of the child and the family (cultural leverage strategy), advocating for the child and family to obtain services—particularly when cultural barriers may interfere with accessing these services (cultural leverage strategy), and tracking the child and family's utilization of recommended mental health services (generic strategy).

Fisher et al[14] propose several recommendations to continue making changes and to promote culturally-relevant care using cultural leverage as a guiding framework:

1. Health care communities need to continue involving culturally-diverse communities in efforts to reduce health care disparities. This type of collaboration will help to identify more effective and culturally-relevant strategies, and will give voice to the representative community, bridging the gap between health care and the surrounding community members.
2. It is imperative for multidisciplinary collaboration to take place between physicians, mental health professionals, nurses, and community members when designing and implementing culturally-relevant health care strategies.

Attending to Cultural Diversity in Mental Health Research

When considering the methodology of mental health research, of particular concern is the lack of attention paid to recruiting individuals who are culturally-diverse.[17,5] Furthermore, when examining the literature regarding evidence-based treatment, it is unfortunate and concerning that most evidence-based treatments are supported by research that has not adequately taken cultural characteristics into consideration.[35] Given the lack of culturally-diverse individuals represented in existing mental health research, these findings may not be applicable to certain cultural groups.[36,5] It has been suggested that cultural minorities are less willing to participate in research—a notion that may create further divide between scholars and culturally-diverse children and families. However, data has refuted this claim, suggesting that willingness to participate in research investigations is not significantly different among different cultural groups. Therefore, the responsibility lies upon researchers to actively increase accessibility for cultural minorities to participate in research, rather than changing the attitudes or beliefs that diverse individuals have about research.[37] Furthermore, a call has been made to involve culturally-diverse communities in the development of investigations that examine mental health topics to encourage collaboration, and to better understand the experiences of diverse children and families.[5]

Other methodological challenges also complicate research in this field. First, because cultural competency has been defined in multiple ways, it is a challenging construct to study due to a lack of appropriate measurement and research designs.[4] Second, it is imperative for more rigorous research investigations to examine the effectiveness of culturally-adapted mental health interventions.[30] Finally, it is important for health care systems to develop systematic efforts for gathering data about cultural variables, and examine this data to inform the development of effective mental health interventions for children and families.[18] Improving methods of gathering data will likely lead to better opportunities for assessing current practices and identifying areas for growth.

Recommendations

As previously discussed, a number of strategies should be implemented by mental health professionals to more effectively address issues of cultural diversity in the delivery of mental health services. These strategies are summarized as follows:

1. **Strive to Enhance Understanding of Culture and Cultural Competence**
   It is important to ensure that mental health practitioners understand their professional community's definition of culture. This will serve as a foundation for enhancing efforts to attend to cultural diversity. Furthermore, it is critical that mental health providers engage in on-going training and professional development opportunities to strengthen cultural competence (eg, training, workshops, and feedback during annual professional reviews). Finally, it is imperative that mental health providers have adequate education regarding the resources that are available in their organization that can assist them with attending to important issues of cultural diversity when working with patients and their families (eg, interpreter services or community resources), and each mental health provider should strive to utilize these resources as needed.

2. **Utilize a Bioecological Framework to Guide Practice**
   Mental health providers should be cognizant of utilizing a culturally-appropriate framework, such as the bioecological model,[26,27] for providing culturally-sensitive care and adequately assessing for cultural factors that can inform development of interventions. Clinicians should receive on-going training and professional development in using such a culturally-informed framework for delivering mental health treatment.

3. **Maintain a Commitment to Using Culturally-Competent Practices when Delivering Mental Health Interventions**
   Mental health providers should continue to use evidence-based treatments (eg, CBT) for treating culturally-diverse youth, while being mindful of tailoring these treatments to the cultural needs of individual children/families. When appropriate, clinicians should consider matching children and families with mental health providers who have similar cultural factors (eg, race, ethnicity, or language) when this has the potential to increase the effectiveness of interventions. Furthermore, mental health interventions should be offered in a way that makes these services as accessible and readily available to children/families as possible (eg, offering community mental health services/outreach directly within the neighborhood of a cultural group). Finally, when working with patients and families, mental health clinicians should consider using assessment tools (eg, SCAP, CFI) to assist with gathering culturally-relevant information about patients and families that can inform treatment goals and interventions.

4. **Utilize Cultural Leverage Strategies[14]**
   Mental health providers should strive to engage culturally-diverse communities in creating strategies for reducing health care disparities. This type of collaboration will help to identify more effective and culturally-relevant strategies for children and families, and will help give voice to the representative community. Such strategies will help to bridge the gap between health care and the surrounding community members. When possible, mental health providers should actively participate in advocacy and outreach efforts to reach culturally-diverse children and families in the community, and create partnerships with the community to obtain direct input about development of culturally-appropriate mental health services for children and families.

5. **Develop Strategies for Gathering Data about Cultural Issues[18]**
   Mental health providers should work to develop a comprehensive data collection mechanism for capturing cultural variables (race, ethnicity, language, etc) about children, adolescents, and families in the community. This data can be used to understand the cultural make-up of the surrounding community and what mental health services are needed, and to develop effective programs for addressing health care disparities that are present in the community.

6. **Increase Access and Availability of Culturally-**

Appropriate Mental Health Services[18]
Mental health providers can implement a number of strategies to help increase access to mental health services to culturally-diverse individuals. For example, it is important to offer written and spoken language services, and ensure that children and families are aware of the opportunity to access these services. Mental health providers should also consider developing culturally-appropriate written materials about mental health services for children and families.

7. Conduct Culturally-Relevant Mental Health Research
Mental health providers should make efforts to engage in research relevant to providing culturally-appropriate services. For example, it would be important to routinely examine differences among cultural variables and mental health outcomes in children and families who receive mental health services.[18] Mental health scholars should also make an effort to recruit culturally-diverse youth and families into research studies to ensure that culturally-diverse individuals are represented in research studies. Finally, there is a need for additional research that examines what mental health interventions are particularly effective for various cultural groups, and takes important cultural characteristics into consideration when understanding psychological health in children and adolescents.

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Behavioral Health and Children with Chronic Medical Conditions or Physical Illnesses

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Psychosocial and behavioral factors such as coping, adjustment, medical adherence, quality of life, and family functioning, impact how children and families navigate the stressful course of living with chronic medical conditions. These crosscutting issues all potentially affect the outcome of medical interventions and medical treatment for children. Psychosocial and behavioral health problems often present some of the most significant obstacles to effective medical care. Thus, a wide variety of psychological interventions and treatment approaches can substantially help families more successfully manage the experience of a child's medical illness. This article focuses on the issues faced by children with medical illness and their families; reviews the literature related to prevention, intervention, and treatment for these children; and offers recommendations for providing behavioral health and psychosocial services to this population.

Crosscutting Issues Facing Children with Chronic Illnesses

Quality of Life

The concept of Health-Related Quality of Life (HRQL) encompasses the impact of childhood illness on a child's physical and emotional well-being.[1] HRQL includes physical symptoms or health status, psychological adjustment, and all aspects of social functioning (eg, peer and family relationships, and academic functioning).[1] All of these are crucial and complementary factors—in addition to treating medical problems—that can and should help inform medical decision-making. In this respect, standardized quality of life measures (eg, PedsQL) are routinely utilized in pediatric populations by behavioral health providers.[2,3] These standardized tools can help inform both medical and mental health treatment. They can also provide information on other areas of a child's life that can be improved through targeted interventions by behavioral health providers.[4] Behavioral health providers in a variety of settings have successfully implemented interventions to increase HRQL, demonstrating improved quality of life across a wide spectrum of pediatric chronic illnesses (eg, asthma, cystic fibrosis, cancer, and/or transplant).[5-7]

Coping and Adjustment

Two of the most salient issues facing children with chronic medical conditions are coping and adjustment. Children and families are required to manage the shock of new medical diagnoses, deal with ongoing invasive medical procedures, and adjust to changes in functioning for both the child with the medical illness and the entire family. Behavioral health and emotional support are often vital to helping families navigate these stressors.

Research has supported that individual, group, and family interventions not only improve coping and adjustment overall, but can also prevent increased hospitalization and risk for mental health diagnoses for children with chronic medical conditions.[8] An area that exemplifies the benefit of psychotherapeutic intervention is the evidence showing that Cognitive Behavioral Therapy (CBT) techniques reduce pain and anxiety related to medical procedures in the pediatric population.[9] Effective components of CBT include breathing exercises and other relaxation and distraction strategies such as guided imagery, cognitive coping skills, filmed modeling, behavioral rehearsal, and active coaching. The overarching

goal of CBT, which overlaps with other therapeutic approaches, is to improve quality of life and help children function more adaptively with fewer psychiatric symptoms during times of stress that are related to medical illnesses.

Emotional Well-Being

Although most children with chronic illnesses demonstrate functioning similar to healthy children or controls, a subset of children with chronic medical conditions are at an increased risk for depression as compared to community samples of children and healthy peers.[10-12] Even without clinically-significant impairment in functioning, children with chronic medical problems often have other problems that impact their overall functioning and emotional well-being. Increased depressive symptoms interfere with a child's ability to cope with medical-related stressors and lead to a decreased motivation to engage in self-care behaviors.[13,14] Of note, depressive and anxiety symptoms are often exacerbated during times of extreme medical stressors.[13,15] Although symptoms vary widely among children with the same medical conditions, some disorders like asthma, recurrent abdominal pain, and sickle cell anemia present a higher risk of depressive and anxiety symptoms than other disorders (eg, cancer, cystic fibrosis, and/or diabetes mellitus).[10] With regards to medically-ill children with psychiatric diagnoses, evidence supports that the same psychiatric treatments used with children without medical illness are effective. (See "Evidence-based practice resources"[16] and "Effective child therapy"[17] for further details on treatment.) When considering psychotropic medication, it is important to know that children are often already taking medication for their chronic illness, and can have unique baseline physiology. Before starting a medication for a child with a chronic illness, the following should be considered: (1) the psychological impact for the individual of "yet another a pill to take," (2) medication interactions with their other medications (eg SSRI and linezolid), and (3) the potential of the medication's side effect profile to worsen the person's overall health (eg stimulants potential to increase blood pressure, which could severely impact a person who has pulmonary hypertension). These issues must be balanced with the importance of treating the individual's mental health symptoms and the potential impact on the child's overall health, which can be addressed by collaboration between psychiatry and the primary medical team for the child with the medical illness.

Family Functioning, Peer Relationships, and Educational Functioning

Correlates of living with a medical illness (school absenteeism and decreased socialization with peers due to medical care and illness) can interfere with normative development across childhood and adolescence. A recent meta-analysis of 954 studies found that, in general, children and adolescents with chronic physical illness have lower levels of academic and social functioning than their healthy peers.[18] Some children require formal Individualized Education Plans (IEP), or 504 Plans, to help develop accommodations to foster success in school. Homebound instruction or therapeutic schools are also options for children with chronic medical conditions, although homebound services limit socialization opportunities.

Positive family functioning can be an additional contributor to the successful navigation of a child's illness. Significant distress around the time of a new diagnosis is certainly a common occurrence for parents; however, literature supports that adjustment and adaptation generally improves over time for most parents.[19,20] Unfortunately, caregiver depressive and anxiety symptoms are risk factors for increased emergency department use and hospitalizations in many pediatric medical conditions; without psychiatric treatment for caregivers, children show worse outcomes.[21-23] Parental distress is also linked with distress of children with medical problems, which highlights the importance of using a model to conceptualize child well-being within a context that acknowledges the influence of their family.[24,25] Siblings are often a frequently-overlooked component within pediatric illness, and clearly impact the functioning of the child with the illness and the entire family unit.[26]

Several theoretical models focus on understanding family functioning, sibling relationships, school functioning, and psychological problems within the context of chronic medical conditions. Behavioral family systems theory, and social ecology and family

systems theories have helped to inform treatment development, testing of interventions, and practice guidelines for treatment for children with chronic illnesses and their families.[27-30]

Given the impact on social functioning for children with chronic illnesses, intervention programs intended to improve their social skills can be very helpful. These programs are usually delivered in small groups, and often teach social skills with role-playing.[31] Groups focused on improving social functioning can help to reduce the significant impact of repeated school absences, and improve ability to reconnect with peers when their medical status allows.

In addition to skill-based groups for children with the chronic illness, family therapy, psychotherapy groups for parents, and psychotherapy groups for siblings are often found to be helpful in improving family functioning, increasing adherence, and improving adaptation.[32-34] Additionally, interventions that can be integrated with the ongoing medical care of children with chronic illnesses add value to comprehensive care, and improve relationships between caregivers and children. This integrated approach provides another avenue of supporting families as they deal with the pediatric illness of a child.[35]

Adherence

Nonadherence, another crosscutting issue in pediatric chronic illness, is a frequent referral question for pediatric psychologists and psychiatrists.[36,37] One recent study found that 77% of the referral questions to pediatric psychologists related to nonadherence.[37] Nonadherence can be either intentional or unintentional and can take on many forms, including skipping medication doses and/or not filling prescriptions. Thorough meta-analyses indicate that the average adherence rates to medical regimens in pediatric populations hover around 75%.[38] Child psychosocial functioning is also clearly related to nonadherence to medical regimens.[38-40] Depression, anxiety, behavioral problems, family stressors, adjustment problems, medical trauma, lack of understanding of medical treatment, and challenges with communication between families and medical providers all contribute to challenges with adhering to a medical regimen.

As noted above, not all children with medical conditions meet criteria for diagnosable psychiatric disorders; however, the impact of some level of internalizing or externalizing symptoms can still impact adherence.[36] Depending on the disease severity and type, nonadherence can lead to devastating consequences including a decline in functioning or even death. Additionally, nonadherence leads to an increased utilization of medical services and a greater number of hospitalizations. Nonadherence also results in preventable morbidity and mortality, and a massive loss of healthcare dollars and productivity.[41]

Despite the numerous difficulties and risks associated with nonadherence in pediatric populations, there is still reason to be hopeful. Consistently, behavioral and psychological interventions have helped increase medical adherence in children and youth.[42,43] Primary theoretical models used within the treatment of adherence include the Health Belief Model,[44] Theory of Planned Action/Planned Behavior,[45] Social Cognitive Theory (Self-Efficacy),[46] Applied Behavior Analytic Theory,[47] and the Transtheoretical Model.[48] All of these models focus on explaining, predicting, and improving adherence from their various perspectives.[49,50] At the core of each model, the following elements exist: (1) the health care provider's communication with the patient, (2) an outline of the patient's cognitive and social processes, and (3) an accounting of patient resources, such as psychological well-being and social support. Interventions focused on treating the underlying psychological problem, and developing behavioral strategies and supports to increase adherence continue to be highlighted in the adherence literature.[37] A recent meta-analysis of 71 studies found that interventions including education and behavioral strategies showed greater improvements post-intervention for children and adolescents with adherence difficulties than those without these strategies.[51] Family, individual, group, and technology-based interventions have been used across a variety of chronic illnesses to promote adherence. Current clinical efforts related to pediatric adherence include continued development, dissemination, and implementation of adherence tools and interventions.

Palliative Care

Palliative care is a medical subspecialty focused on a holistic approach to the relief of suffering for children and adults living with a life-limiting or life-threatening illness. Although well-established in adult medicine, pediatric palliative care has only expanded in the last

decade.[52] The World Health Organization, Institute of Medicine, and the American Association of Pediatrics have all publicly recognized the importance of developing pediatric palliative care as a field.[53,54] A survey of hospitals with 50 or more beds indicated a 126% increase in general palliative care programs between the years 2000 through 2008; however, pediatric programs are not specified.[55] In pediatric populations particularly, the nature of barriers to integrating palliative care ranges from cultural to institutional (eg, accurately defining palliative care as simultaneous with curative treatment, distinguishing from hospice, and lacking knowledge about the documented benefits of palliative care).[56]

Research has begun to document the positive outcomes associated with pediatric patients who receive palliative care. These outcomes include fewer procedures, less invasive interventions, fewer days in intensive care, a greater likelihood of the family receiving supportive services, and higher family satisfaction.[57,58] Although the premise of palliative care rests on a holistic approach to the patient and family, psychologists and psychiatrists are rarely team members on palliative care services.[59,56] Teams often include a social worker and chaplain to address emotional and spiritual aspects of suffering and quality of life. There is evidence, however, that the inclusion of psychology and psychiatry may add important competencies to the palliative care patient's assessment, symptom management, and quality of life.[59,60,54]

A psychological assessment can distinguish normative versus pathological symptoms within the complexity of childhood development layered by life-threatening illness, thus identifying children at risk for a psychiatric diagnosis that may otherwise be missed.[56,54] The goal of palliative care is *palliation*, or relief of suffering. Mood, anxiety, and behavior symptoms that co-occur with life-threatening illnesses and their treatments significantly contribute to this overall experience of suffering.[60] Psychopharmacological interventions are often a key part of reducing acute anxiety in the medical setting, as well as sleep disruptions that contribute to heightened anxiety and worsened mood. Behavioral interventions help decrease problem behaviors, especially in young children, and can focus on medical adherence issues interfering with quality of life[42,43]; relaxation strategies targeting sleep disruptions, anxiety, and pain symptoms[61]; and cognitive behavioral interventions addressing worries and fears that are inherent in coping with a life-threatening or terminal illness. Hypnosis, guided imagery, biofeedback, and mindfulness-based stress reduction have shown to be efficacious treatments of pain and stress,[61] and therefore important components of addressing suffering and symptoms in pediatric palliative care patients. Interventions targeting anticipatory grief and bereavement grief are also an essential part of providing the spectrum of palliative care.[60]

Recommendations

Children with chronic medical conditions and their families face a number of challenges as they respond to and adjust to life following diagnosis. Clearly, the nature of these challenges means that behavioral health providers are especially well-positioned to help. Accordingly, the following strategies are recommendations to improve the access to and successes of behavioral health services for children with chronic illness who are seen in children's hospital settings.

First, children's hospital settings should ensure smooth referral processes for medical providers referring patients to psychiatry providers. Ideally, utilization of embedded behavioral health providers within specialty medical clinics can help to develop screening methods and streamline the referral process. However, where this is not available, a standardized and simple strategy to refer patients to one centralized place in the psychiatry department is vital. Short waiting periods for these referred patients to be connected to a behavioral health provider increase the likelihood of patients following up on the referrals provided by their specialty or primary medical providers. Given that children with chronic medical conditions often have to make many visits to the medical setting, it is also recommended that all attempts be made to coordinate psychiatry department visits with medical visits.

As previously mentioned, many children with chronic medical conditions do not meet the criteria for psychiatric conditions; however, they would still benefit from referrals to receive behavioral health interventions and services. Strategies should be developed to improve reimbursement for such behavioral health services provided to children with chronic medical conditions. This may require increased focus on authorization for health and behavior billing, and pro-

viding associated insurance authorization teams the appropriate knowledge and skills related to contracting for health and behavior assessments and billing. Along these lines, psychiatry departments should engage in advocacy at the state and national level to improve reimbursement rates for health and behavior codes for patients.

Psychiatry departments should also focus on prevention, which could be done by developing strategies to screen children with new diagnoses regarding their need for support during adjustment to new medical conditions. This recommendation often stands in stark contrast to the current, standard referral for consultation liaison services or outpatient psychiatry when children are in crisis (eg, prolonged period of nonadherence, and/or suicide attempts).

Specialized programming including support groups, social skills groups, and parenting skills should be available for children with chronic medical conditions and their families. Commonalities occur across many chronic illness disease types creating the potential to develop multi-illness groups targeting the same issues (eg, adherence or social acceptance). Groups could be hosted with greater frequency, and with less overall resources, if they are embedded within a department of psychiatry rather than duplicated in each department.

Education and training on adherence assessments and interventions should be provided to trainees, staff, and faculty in the department of psychiatry with a specific focus on adherence to psychotropic medications. Offering education to medical providers on the ways they can facilitate adherence in their patients in order to optimize treatment adherence from the start, rather than after problems emerge, is also recommended.

Departments can also provide education to medical colleagues about the role of pediatric psychologists and psychiatrists to improve understanding about the following: (1) the role of these providers, (2) appropriate referrals, (3) the way in which pediatric psychologists and psychiatrists contribute to multidisciplinary patient care, and (4) the strategies and interventions that these providers commonly use with pediatric patients.

Lastly, much room exists for a significant increase in the level of collaboration between psychiatry and psychology services and palliative care. Expanding all current palliative care programs to involve mental health services in the inpatient setting will certainly be an improvement.

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Integrated and Embedded Behavioral Health Care in Pediatrics

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Introduction

Over the past 30 years there has been an increasing presence of behavioral health services integrated into pediatric primary care and subspecialty clinics. While the range of pediatric conditions/clinics where mental health professionals practice is broad, the largest evidence base for the integration of behavioral health is in the treatment of children with chronic pain, hematological-oncological disorders, and diabetes. However, the research base is expanding to include conditions such as asthma, obesity, sleep disorders, and interventions in pediatric primary care. Behavioral health intervention can be organized around children with a specific medical diagnosis, symptom management, or crosscutting issues such as adherence. While initial integration of mental health in pediatric care focused on specialty pediatrics, within the past 10 years there has been an increased recognition of the benefits of providing behavioral/developmental screening and mental health care in the primary care setting. One common thread through all of these settings is the participation of the behavioral health clinician in a multidisciplinary team that includes not only pediatric medical practitioners, but also a variety of allied health professionals. It is beyond the scope of this article to exhaustively review the literature on integrated mental health care in pediatrics as the field now encompasses a very broad range of pediatric conditions; instead, the article will highlight areas of integrated care that represent the broader range of services provided. In particular, behavioral health in pediatric primary care, pediatric chronic pain, Type I Diabetes, and obesity will be reviewed.

Behavioral Health in Pediatric Primary Care

Pediatric primary care (PPC) provides an optimal setting for the practice of integrated behavioral health services. Pediatric primary care settings provide continuous and comprehensive medical services that are readily accessible to the vast majority of children in the United States and their families.[1] These settings are ideally suited to promote optimal development and well-being through the provision of expanded services that address parental concerns, developmental tasks, psychosocial factors, and behavioral health issues in the context of trusting relationships with familiar providers.[2] Behavioral health clinicians integrated into PPC are able to promote the health and well-being of children and families in a manner directly aligned with the mandates and guidelines of the practice of primary care.[3] According to the American Academy of Pediatrics (AAP)[4] and the Centers for Disease Control,[1] there are approximately 34,000,000 routine infant/child well-child checks per year in PPC in the United States for patients from birth to 22 years of age, with approximately 121,000,000 visits for children under 15 years of age. Pediatric primary care is often the only available entry point to services for vulnerable children and their families.[2]

Although the American Academy of Pediatrics and Bright Futures provide systematic guidelines and outline methods for comprehensive surveillance and screening during well-child checks, most pediatric practices and providers are overwhelmed by the complex risk factors presented during routine visits lasting an average of 18 minutes, and may be reluctant to solicit information about behavioral and psychosocial matters because they feel unable to

adequately address them.[5,6,2] Therefore, children experiencing significant risk factors that impact development and family functioning remain unidentified. Even when risk or early disturbance is identified, families often have difficulty accessing necessary community resources.[2]

Behavioral health disorders and patients and families with environmental risk factors often present first to PPC before accessing services through the mental health system.[3] PPC clinicians play an important role in screening for behavioral and developmental conditions, and providing *early* and less intensive interventions. With the help of integrated behavioral health clinicians, primary care providers have the capacity to identify and manage emotional conditions early on, when there is a greater likelihood they can be prevented or ameliorated. Data have clearly demonstrated that integrating mental health care into primary health care leads to better health outcomes and substantial cost savings.[7]

More than 20% of children and adolescents in the U.S. have a diagnosable mental health problem, and only approximately 20% of those receive adequate treatment.[3] Although there are often access issues and difficulties navigating complex mental health systems, most children do receive pediatric primary medical care. Therefore, screening, assessment, and interventions embedded within PPC are clearly indicated, and have been demonstrated to be effective. The American Academy of Child and Adolescent Psychiatry and the American Academy of Pediatrics[3] have both recognized the significant need for earlier detection and prevention of mental illness in children, as well as improved ability of primary care physicians to initiate treatment. Statistics indicate that 15%-25% of pediatric patients have significant psychopathology, functional impairment, and/or psychiatric comorbidity.[8] Additionally, 18% of patients meet full criteria and 14% meet sub threshold criteria for mental health diagnoses.[8] Approximately 75% of children with psychiatric disturbances are seen in PPC,[9] and 50% of all PPC visits involve concerns about behavioral, psychosocial, or emotional concerns.[8]

Assessment Methods

The American Academy of Pediatrics Bright Futures program[5] emphasizes frequent mental health screening to begin the process of identifying children who may need mental health resources and referrals. Assessment in PPC can range from brief, informal assessments that involve record/case review with a physician to more extended, formal assessment. Clinical consultation, behavioral observation, and clinical assessment performed by a mental health clinician are often performed in the context of PPC, when an identified concern has been reported. Research has shown that tools such as the Pediatric Symptom Checklist (PSC) can be used for routine use in a PPC setting as well as combined with other assessment methods to create an integrated approach to assessing and treating behavioral and physical health in a pediatric system of care.[10]

Assessment in PPC can serve a number of purposes, including screening, diagnostic assessment and clarification, treatment planning, determining effectiveness of treatment (eg, medication or behavioral intervention), and identifying barriers to treatment. Screening in PPC is a fundamental intervention that facilitates prevention, increases anticipatory guidance, and creates an opportunity to assess risk factors and promote well-being and positive functioning. *Screening* is defined as a brief, formal, standardized evaluation, for the early identification of patients with unsuspected deviations from normal.[11] There are several types of screening interventions indicated for use within PPC.

Developmental screening. To improve the early identification and treatment of children with developmental disability, the American Academy of Pediatrics (AAP) recommends that all infants and young children be screened for developmental delays in the context of PPC.[12] Furthermore, the AAP recommends performing developmental surveillance at every well-child visit, and if developmental concerns are raised by the parent or provider during surveillance. Select screening measures that are brief, accurate, and easy to administer and score are available to assist primary care providers in the early detection of developmental and behavioral disorders. There are several developmental screening tests that use information provided by parents or direct observation of providers. The Ages and Stages Questionnaires (ASQ, formerly the Infant Monitoring System) is one of the most widely used tools to

screen development in children from 4 to 60 months[13] on 5 domains: communication, gross motor, fine motor, problem solving, and personal-social.

Pregnancy-related depression screening. There has been debate about whether or not screening for pregnancy-related depression in mothers belongs in PPC.[14] Bright Futures for Mental Health encourages pediatric primary care providers to inquire about depressive symptoms and consider formal screening for pregnancy-related depression using a validated scale.[14,15] Research indicates that pediatric primary care offices can readily identify pregnancy-related depression and related concerns, and make appropriate referrals to local mental health providers.[16] When symptoms are identified, recommendations include discussing the safety of mother and baby, referring the mother to a mental health provider, scheduling more frequent pediatric visits, and using phone contacts between visits for ongoing monitoring.[14]

Interventions in PPC

Behavioral health clinicians in PPC engage in activities that "improve the health-related quality of life of children and their families."[17] Such activities have been shown to be effective, sustainable, and directly related to improving health and well-being.[18] These activities include: providing anticipatory guidance during routine well-child visits; screening; early identification and referral related to developmental and behavioral issues; providing initial assessment and treatment for issues that could lead to significant impairment if left untreated; and triaging, referring to, and coordinating care with community resources when higher levels of care are necessary.[2] Behavioral health clinicians in PPC help improve adherence, promote healthy behaviors and reduce behaviors that increase health risks, and improve communication between healthcare providers and the patients and families they serve.[17]

Attempts to deliver integrated mental health treatment in PPC have shown promise in randomized trials.[19-21] A study of an internet-based psychoeducation intervention targeting patients with behavioral problems has shown to be effective in a PPC setting.[22] Another study of an on-site family intervention for children with behavior problems has also been supported as an effective intervention in PPC.[23] Additionally, studies have found an increase in family compliance and satisfaction with services delivered by an on-site nurse clinician within a collaborative mental health team in a PPC practice.[24,20] There have been 2 studies showing modest effects at reducing depression in adolescents through an on-site Internet-based intervention in PPC.[25,26]

An on-site modular intervention within PPC aimed at improving access to mental health services and outcomes for children with behavioral problems demonstrated an increased likelihood that patients received mental health services, reported fewer barriers to and more satisfaction with services, and showed greater improvements on outcomes related to behavioral disorders at 1-year follow up, compared to enhanced usual care within PPC.[20] This intervention included approximately 6 sessions with a nurse for training in CBT skills, and as needed, 2-4 booster sessions to address emergent issues or promote maintenance of the parenting skills taught to these families. This intervention was compared to, and shown to be more efficacious than, enhanced usual care within PPC, which included a referral to an off-site mental health provider.[20]

The Services for Kids in Primary-care (SKIP) treatment research program (www.skipprogram.org) integrates personalized behavioral health services in PPC settings and has produced impressive results related to the efficacy of integrated behavioral health programs in PPC.[20,27] The feasibility and clinical benefits of doctor office collaborative care (DOCC) has been shown to be effective in addressing behavioral problems and supporting the integration of behavioral and mental health services in PPC.[28] Significant improvements in behavioral and emotional problems were found for pediatric patients who received psychoeducation, brief modules of skills training in CBT, and care coordination by behavioral health clinicians or trained nurses embedded within PPC as compared to pediatric providers providing the parent with psychoeducation about the child's symptoms, clinical recommendations, and up to 3 referral options.[28]

Recommendations

The well-understood barriers to accessing specialty mental health services along with the growing significance of untreated mental health problems in children and adolescents have expanded the need for PPC to better identify and manage behavioral health. While substantial barriers exist in creating sustainable behavioral health programs in PPC, the evidence

clearly highlights the importance of integrated mental health programs for children and adolescents in their medical home. Better advocacy is needed to address the significant challenges surrounding reimbursement for behavioral health services in primary care, and to ensure that health and behavior codes are (1) routinely used by behavioral health clinicians to document the services provided in PPC, and (2) universally-covered benefits in pediatric health insurance plans.[2] Additional exploration and use of innovative funding mechanisms could better sustain and support behavioral health billing in PPC.[2]

Additional research efforts and funding opportunities are needed to assess the costs and benefits of integrated models in PPC to determine the most effective and efficient approach to services. While programs such as SKIP[20,27] have demonstrated efficacy in implementing a collaborative care model of intervention for the treatment of externalizing childhood behavioral health disorders, it is recommended that additional evidence-based programs be developed to address a broad range of behavioral health disorders to test the feasibility and sustainability of PPC-specific interventions to treat pediatric mental health disorders in PPC.

Behavioral Health in the Management of Pediatric Chronic Pain

It is remarkable that there is now an extensive evidence base for the behavioral management of pediatric chronic pain, given that as recently as the mid 1980's there were still questions within the medical literature as to whether infants and children could feel pain, due to the immaturity of their central nervous system. After pioneering research in anesthesiology and pediatrics demonstrated unequivocally that infants and children do in fact feel pain, and that the practice of not treating pain could lead to increased morbidity and even mortality in children, the stage was set for the development of the field of pediatric pain research and treatment. Today there is a strong evidence base for cognitive behavioral therapy interventions in the management of chronic pediatric pain.

The pediatric chronic pain literature has focused on children aged 7-18 years. The prevalence of chronic pain in children varies according to the medical condition, with estimates ranging from 6%-18% for children with tension type or migraine headaches, 13% for abdominal pain in children and 17% in adolescents, and 23%-45% for musculoskeletal pain, with a higher prevalence in adolescents and in females. Disease or treatment-related pain has a significantly higher prevalence, ranging from 29% with phantom limbs to 88% in irritable bowel syndrome.[29] The most common pediatric chronic pain conditions are headache, abdominal pain, musculoskeletal pain, and fibromyalgia.[30] Pain-related disability increases with age, and there is a gender difference that emerges in adolescence; more girls than boys reporting pain-related functional disability.[31]

Assessment Methods

Assessment of chronic pain in childhood starts with a biopsychosocial perspective to take into account the multiple factors that can influence the child's pain experience and the pathways by which they exert these effects. Several developmentally sensitive, validated instruments are now available to measure the sensory, affective, behavioral, and interpersonal/social aspects of children's pain.[32] Thorough baseline and ongoing assessment is essential for guiding interventions for chronic pain and evaluating the child's response to treatment. Representative assessment methods are detailed below.

Clinical interviews and comprehensive pain assessment questionnaires. The Children's Comprehensive Pain Questionnaire (CCPQ)[33] and the Varni-Thompson Pediatric Pain Questionnaire[34] are interviews that separately assess the child's and parents' experience of the child's pain problems with open-ended questions, checklists, and quantitative pain-rating scales. The well-documented comorbidity between pediatric chronic pain and psychiatric disorders, particularly internalizing disorders such as depression and anxiety, obligate the clinician to screen for these disorders along with pain-related fears and avoidance behaviors.[35-41] Instruments such as the Pain-Anxiety Symptoms Scale (PASS) use a comprehensive approach to assessing pain.[42,43]

Coping. The Pain Coping Questionnaire (PCQ),[44] Pain Response Inventory (PRI),[45] Pediatric Pain Coping Inventory (PedsQL),[46] Pain Catastrophizing Scale for Children (PCS-C),[47] and Response to Stress Questionnaire (RSQ)[48] assess pain-specific coping strategies. Researchers are identifying subgroups of pediatric chronic pain patients based on coping profiles to better target treatment to individual characteristics.[49,50]

Functional Impairment. The Pediatric Migraine Disability Scale (PedMIDAS) assesses functional impairment associated with headache.[51] The Child Activity Limitations Interview (CALI)[52] assesses the impact of recurrent pain on children's daily activities as a way to identify appropriate targets for treatment. Additionally, the Functional Disability Inventory (FDI)[53] and The PedsQL Generic Core Scales[54] assess the impact of pain on child functioning and health-related quality of life respectively. The Quality of Life Pain-Youth (QLP-Y)[55] was developed to address quality of life issues particular to chronic pain.

Behavioral observations and symptom diaries. Behavioral observation scales[56] provide in vivo information on pain-specific behaviors, while electronic diaries have been shown to be feasible and result in greater adherence and accuracy in recording as compared to traditional paper diaries in children with recurrent pain.[57,58]

Evidenced Based/Informed Treatments

Behavioral pain interventions are typically delivered within the context of a multidisciplinary team that can include physicians, nurses, and physical and occupational therapists, along with psychologists or mental health providers. Importantly, chronic pain treatment programs typically require behavioral health assessment and treatment, given the social and emotional impact of chronic pain on the child and the family as a whole. A rehabilitative approach that shifts the focus from the narrow goal of pain reduction to decreasing pain-related emotional and behavioral disability to improve the child's functional status characterizes the course of most chronic pain treatment programs for children.

Research on the use of psychological therapies is limited primarily to clinical trials in children with headache.[59] In a meta-analysis conducted to evaluate the efficacy of behavioral intervention for pediatric chronic pain, Eccleston and colleagues concluded, "There is strong evidence that psychological treatment, primarily relaxation and cognitive behavioural therapy, are highly effective in reducing the severity and frequency of chronic pain in children and adolescents."[59]

Psychological treatments have been found to improve pain in for children with sickle cell disease,[60-62] recurrent abdominal pain,[63-66] complex regional pain syndrome, Type I,[67] musculoskeletal pain,[68,69] and juvenile primary fibromyalgia syndrome.[70,71] A recent meta-analysis found a large positive effect for psychological intervention on pain reduction post-treatment and upon longer-term follow-up with small and non-significant effects found for disability and emotional functioning.[72] Acceptance and Commitment therapy (ACT) has been found to be a promising treatment for adolescents with chronic pain.[73]

There is growing acknowledgment of the parents' crucial role in successful rehabilitation of youth with chronic pain, and thus treatments are increasingly involving parents as active partners in their child's treatment.[65,74-77]

There is evidence to support the use of single behavioral treatment modalities in the treatment of pediatric chronic pain, as in the use of thermal biofeedback and relaxation for recurrent pediatric headache.[78] Most treatment programs include a diverse array of techniques that treat chronic pain by modifying children's cognitive, affective, and sensory experience of pain, their behavior in response to pain, and environmental and social factors that influence the child's pain experience. Techniques to alter the sensory aspects of chronic pain can include relaxation training, biofeedback, imagery, and hypnosis.

Few component analyses have been conducted to determine which psychological therapies may be most essential in management of pediatric chronic pain. Evaluation of specific behavioral components could provide a key evidence base for what the most active components are in multicomponent interventions, and inform the tailoring of interventions to the individual patient.

While the research to date has focused on improved pain control as a primary outcome of treatment, studies are underway to examine the impact of treatment on psychiatric comorbidity and functional status. Complementary therapies such as occupational and physical therapies, massage, yoga, and acupuncture are increasingly available to children seen in chronic pain clinics, but there is limited literature to document the efficacy of these treatments in pediatric patients.[79]

Treatment Delivery. Several methods for the delivery of psychological interventions for recurrent or chronic pain in children have been shown to be effective, including those that involve intensive inpatient[74,80] or

outpatient treatment,[66,73] those that are self-administered,[81] school-based,[82,83] Internet-based,[84] CD-ROM based,[85] and those that involve minimal clinic contact with home-based practice.[86,87] The variety of methods for the delivery of these interventions offer opportunities to reach a broad population of children with chronic pain, thus increasing the potential to reach many more children than can be treated in specialized pediatric pain treatment centers.

Recommendations

Behavioral health is integrated into the Integrative Headache Clinic in Neurology at the Children's Hospital Colorado (CHCO), where children receive a multidisciplinary assessment at baseline. However, there are insufficient resources for ongoing behavioral health treatment after the initial assessment, causing a disconnect in the biopsychosocial approach to treating patients. The anesthesia chronic pain program has psychologists; however, behavioral treatment is co-located but not integrated with other health care providers.

One important recommendation involves the consideration of providing formalized training in pain-coping skills for conditions known to be associated with recurrent or chronic pain. These include headache, inflammatory bowel disease, juvenile idiopathic arthritis/juvenile rheumatoid arthritis, and functional GI disorders. Additional recommendations include the use of standard assessments for psychiatric comorbidities and the development of interdisciplinary transdiagnostic skills groups for children with recurrent or chronic pain in addition to E-health options, including internet and app-based interventions.

Behavioral Health in the Management of Pediatric Type 1 Diabetes Mellitus

Over 215,000 U.S. residents younger than 20 years old have type 1 (T1DM) or type 2 diabetes. This represents 0.26% of all people in this age group. During 2002–2005, 15,600 youth were newly diagnosed with T1DM annually, and 3,600 youth were newly diagnosed with type 2 diabetes annually. The prevalence of T1DM in Americans under age 20 rose by 23% between 2001 and 2009.[88]

Optimal glycemic control of hemoglobin A1c (HgbA1c) between 6% and 8% for adolescents is used to ensure current health and reduce the risk of future microvascular and macrovascular complications such as heart disease, nephropathy, retinopathy, and neuropathy.[95] Multiple studies demonstrate that young adulthood is the period of poorest glycemic control, with mean HgbA1c level peaking in late adolescence. Average result for HgA1c in one study was 11.1% at 18-19 years of age.[89] Glycemic control often deteriorates during adolescence[90] such that by 20 to 29 years old, mortality is increased 3-fold in diabetic men and 6-fold in diabetic women compared with the general population.[91] Acute complications are the major cause for mortality in this age group, with 68% of diabetes-related deaths being certified as due to hypoglycemia and ketoacidosis.[92] Even small changes in insulin control can have large benefits to health. One percentage point drop in HgbA1c (eg, 9.0%–8.0%) is associated with a 40% risk reduction of developing retinopathy.[93]

Coinciding with poor glycemic control is a concomitant rise in mental health issues. During the period of 17-25 years of age, psychiatric disorders in patients with diabetes needing insulin management increased from 16%-29% and predicted recurrent admission with diabetic ketoacidosis.[94] This leads to concerns for how to manage patients with both high-risk medications and high-risk mental health disorders.

Adolescents living with T1DM must learn to cope with the demands of adhering to a lifelong medical regimen, which, in turn, may impact psychological well-being and reduce the likelihood of optimal treatment adherence.[95] Behavioral problems resulting in poor treatment adherence include greater youth responsibility for self-care that in turn predicts poorer self-care behaviors, less frequent exercise, less frequent blood glucose monitoring, increasing behavioral problems, poor communication and high levels of conflict within the family, and poor social skills and coping abilities.[96-98] The most common referrals for psychological/behavioral intervention include problems with treatment adherence, social concerns, and diabetes-related anxiety.[95]

Adolescents diagnosed with T1DM have a 2 to 3-fold increased risk (22.8%) for depression compared to healthy peers.[99] An increase in general anxiety and illness-specific fears is also common.[100] Depressive symptomology in adolescents with T1DM is predictive of less frequent blood glucose monitoring and increases in HgbA1c by 0.5% (8.5%-9.0%) for every 5

points increase on Children's Depression Inventory.[99] Anxious symptomology is also associated with higher HgbA1c levels and less frequent blood glucose monitoring.[100] In addition to the high rates of comorbid anxiety and depression, eating disorders are common psychological problems for adolescents with T1DM.[101] Eating disorders are associated with poor glycemic control. An estimated 10% of adolescent girls with T1DM may meet criteria for an eating disorder, twice the rate for girls without diabetes.[102]

All of these impairments, plus the added burden of functioning with a chronic medical illness, results in overall decreased quality of life (QOL), measured by the PedsQL, as well as impaired peer, school, and family functioning.[101] Interventions that improve psychological functioning and diabetes-related behaviors are associated with optimal glycemic control. Toward that end, an integrated care model of embedding psychologists within an urban pediatric endocrinology clinic has been shown to improve medical outcomes of adolescents with T1DM.[103]

Assessment Methods

Many studies have demonstrated improvements in glycemic control and treatment adherence for youth with diabetes.[104-107] Adherence can be measured with: (1) HgbA1C, which demonstrates a 3-month measurement of glycemic control; and (2) Diabetes Self-Management Profile, a 24-item structured interview that yields an estimate of overall treatment adherence over 3 months.[107]

Resultant changes in quality of life and affiliated mental health issues are also a high burden in this population. These issues can be assessed using a health-related quality of life scale such as the Pediatric Quality of Life Inventory (PedsQL), a modular instrument designed to measure health-related quality of life (HRQOL) in children and adolescents aged 2-18 years; a depression scale such as the Children's Depression Inventory (CDI), which evaluates the presence and severity of specific depressive symptoms in youth and the Revised Children's Anxiety and Depression Scale (RCADS); and the Spence and SCARED scales for self and parent report of anxiety symptoms. The RCADS, Spence, and SCARED scales are quickly and easily administered, and their availability for use at no cost facilitates the assessment of anxiety and depressive symptoms during medical visits.[108]

Access and utilization of psychological services are an ongoing difficulty in various populations of at risk youth. Among adolescents referred to psychology services from medical practices, 66 % initiated treatment when services were offered in clinic, whereas only 2.6 % followed through with the referral when it was located off-site.[109] This study highlights potential improvement in care for medical and psychiatric symptoms when care can be accessed in the same clinic.

Evidence-Based Interventions

Interventions have targeted treatment adherence and self-management, family dynamics, social functioning, coping skills, and diabetes-specific anxiety management.[103]

Trials with education directed at coping skills training reported lower impact of diabetes, better coping with diabetes, better diabetes self-efficacy, fewer depressive symptoms, and less parental control.[110] Psychological interventions of various theoretical orientations have improved aspects of self-care in adolescents with T1DM. Examples include cognitive behavior therapy (CBT),[111] behavioral family systems therapy (BFST),[95,107] family systems theory,[112] multisystemic therapy (MST),[113] and coping skills for youth with T1DM.[114]

In a family systems group intervention, perceptions of diabetes, estimates of youngsters' self-care, family functioning, and more positive perceptions of being a teenager with diabetes were found.[112] Adolescents demonstrated clinically significant improvements in HgbAlc that were maintained at 6-month follow up. Parent reports suggested that adolescents in the intervention groups improved their diabetes care. Findings support the use of multifamily groups plus parent simulation of diabetes as an intervention strategy for adolescents with diabetes.[112]

Studies using Multi Systemic Therapy (MST) suggest it has the potential to decrease inpatient medical admissions among adolescents with poorly-controlled T1DM.[113] Revised Behavioral Family Systems Therapy (BFST) interventions show enhanced impact on diabetes outcomes compared to previous BFST interventions.[95,107] The revisions included required targeting of diabetes-specific behavioral problems, extension of treatment from 3 to 6 months, training in behavioral contracting techniques for all families, a 1-week parental simulation of living with T1DM, and optional

extension of therapeutic activities to other extra-familial social environments affecting the child's diabetes management. A statistically-significant reduction of up to 1% in HgbA1C was seen when compared to the control group after 6-18 months in BFST-D.[107]

Multi-component interventions that address the emotional, social, and family processes associated with being an adolescent with T1DM can have more robust effects on HgbA1c than a single-point intervention like increase in blood glucose monitoring frequency.[115] A coping skills training program produced statistically significant improvement in HgbA1c, medical and diabetes self-efficacy, and quality of life. This program of 6 small group sessions and monthly follow up help youth cope with their lives in the context of diabetes management. Skills include social problem solving, cognitive behavior modification, and conflict resolution.[114]

An at-risk population of adolescents with T1DM who engaged in pediatric psychology treatment, which included incorporating family into care of the patient, behavioral aspects of their medical management, and improving cognitive processing for the patient and family that may impact overall psychological health, experienced significant reductions in HgbA1c over time compared to no treatment and control groups. The average number of sessions and duration of treatment for adolescents and families was 8.28 sessions over a 9-month period.[103] These studies show that behavioral interventions can have real impact on medical outcomes in children and adolescents with T1DM.

Recommendations

Continued parental supervision of adolescents, along with monitoring diabetes knowledge and efficacy, may help optimize transfer of diabetes care from parents to youth. Behavior problems warrant immediate attention because of their direct and adverse relation to metabolic control.[96] Results suggest that depressive symptoms are important predictors of HgbA1c change by themselves, as well as when considered with adherence to blood glucose monitoring. Screening for depressive symptoms, and expanding and developing prevention and intervention strategies put adolescents with T1DM in the best position for optimal glycemic control.[99]

The International Society of Pediatric and Adolescent Diabetes Consensus Guidelines states, "Psychological factors are the most important influences affecting the care and management of diabetes."[116] Social workers and psychologists should be part of the interdisciplinary health care team. Overt psychological problems in young persons or family members should receive support from the diabetes care team and expert attention from mental health professionals. The diabetes care team should receive training in the recognition, identification, and provision of information and counseling on psychosocial problems related to diabetes.

Psychological interventions can improve glycemic control for adolescents with T1DM. Although individual CBT therapies are more common, family therapies appear more effective for adolescents.[117] Across treatment modalities, the inclusion of psychological intervention as a component of pediatric diabetes care can improve individual and family adjustment and may increase treatment adherence and glycemic control.[103]

Embedding psychologists within pediatric endocrinology practice, in lieu of referring to an outside mental health provider, is one strategy used to facilitate the provision of interdisciplinary care, increase access to and utilization of services, and improve patient communication among providers. This model appears to be the most effective at engaging adolescents and families. Psychological services can be effectively embedded in a pediatric endocrinology clinic to offer an accessible and widely-utilized service that results in meaningful reductions in HgbA1c and a reduction in long-term microvascular complication risk.[103]

Behavioral Health in the Management of Pediatric Obesity

The incidence and prevalence of childhood obesity has increased significantly since the 1980s, and the average overweight child today is more overweight than the average child of 20 years ago.[118,119] Approximately 15% of children and adolescents between ages 6-9 are obese, and 10% of children between 2-6 years of age are obese.[118] There are significant differences in childhood obesity among racial and ethnic groups. More than 23% of African American and Latino children are obese, with African American girls having the highest rates of obesity.[118]

Certain psychosocial factors put children at a higher risk of obesity. These factors include abuse, neglect,

and having a nonsupportive family. Children who experience neglect have a 9 times greater risk of becoming obese.[120] Obese children and adolescents have higher rates of low self-esteem and negative body image than their same age peers.[121-127] In terms of psychiatric comorbidity, obese children who present for mental health treatment have higher rates of depression, anxiety, somatoform, and eating disorders.[128-131] In adulthood, childhood obesity is associated with fewer years of education and increased poverty.[132,133]

There is an array of health complications associated with pediatric obesity. In adolescents, obesity is associated with high blood pressure and elevated lipids, which increases risk of disease and death.[134] Compared to adults who had normal weight as children, adults who were obese as children have twice the rates of heart disease and high blood pressure and 3 times the rate of diabetes.[135] Further, being obese as an adolescent is a better predictor of adult mortality than being obese as an adult.[136] The rate of type 2 diabetes in children increased 10 times from 1982-1992, with over 90% of those children having a BMI greater than 90th percentile.[137] Over 90% of obese children have some kind of sleep disorder, typically sleep apnea.[137]

Assessment Methods

Obesity is determined by body mass index (BMI), where children with BMIs greater than the 95th percentile are considered obese,[138] and those with BMIs between the 85th and 95th percentile considered overweight and high risk. Because of well-documented health risks associated with obesity, a complete physical is warranted to rule out any health complications or contributing factors.

There are no psychological assessment measures specifically recommended for pediatric obesity. Therefore, clinical interviews with parents and child, as well as standard measures for depression (Child Depression Inventory, and Child Behavior Checklist), anxiety (State-Trait Anxiety Inventory), and self-esteem (Perceived Competence Scale for Children) are recommended.[137] The Children's Eating Behavior Inventory and the Children's Eating Attitude Test can also be used to determine readiness to change, or readiness for referral to a weight management clinic/program.[137]

Evidenced-Based/Informed Interventions

Unlike the treatment of adult obesity, the primary goal for treating pediatric obesity is improving eating habits and increasing physical activity, not weight loss.[134] Although the models are heterogeneous, behavioral interventions are considered first-line treatments for pediatric obesity. They have demonstrated the greatest efficacy, with medium to high intensity level interventions having the most impact.[139] In addition to changes in diet and activity level, families are typically included in treatment, especially for younger or school-aged children.[105,137] Specific intervention strategies include improving problem-solving skills, goal setting, decreasing exposure and access to unhealthy foods, and relapse prevention.[139-141] Evidence supports the use of weight-loss medication combined with behavioral treatment in older adolescents who meet criteria for class II obesity.[140]

Recommendations

Treatment for pediatric obesity typically occurs in specialty obesity clinics with multidisciplinary teams that often include social workers and/or psychologists in addition to a variety of other medical providers.[140] Formal guidelines and policies should exist that reflect the importance of multidisciplinary care for pediatric obesity and mandate the presence of behavioral health providers as part of care teams. Additional efforts could focus on implementing routine psychosocial screeners to identify risk factors and comorbidities that can be treated to improve obesity and adherence to obesity-related interventions.

Two behavioral treatments for pediatric obesity highlighted in recent review articles have been recommended for use in primary care settings due to the brief intervention time required (about 4 hours total), and use of support staff for mailings and phone call counseling.[142,143,140] Such interventions should be evaluated for efficacy, feasibility, sustainability, and implementation into various types of pediatric primary care clinics (eg, community-based, academic medicine, federally qualified health centers, etc). Collaborative efforts should focus on training medical providers to feel more confident in knowing when to appropriately assess and treat pediatric obesity within primary care, and when to refer out to subspecialty clinics.

Conclusion

While the range of integrated behavioral health services, from primary care to the most specialized tertiary care, is increasing, the need for such services is endless. One of the biggest challenges to the development of integrated services is the decision making about which services provide measurable benefits to the populations served, and the optimal platforms for delivery. Rational decision making will require service providers to gather data to inform service development and monitor the impact of such services on health outcomes and sustainability. There is preliminary evidence of the acceptability and effectiveness of providing integrated mental health services in primary care, as well as in subspecialty clinics. The early identification and treatment of developmental and psychiatric disorders within the context of the child's medical care, family, and larger social environment provide the opportunity to prevent and manage the long-term health consequences of complex conditions such as diabetes and obesity. The potential for improving the health of children and their families is great; however, to fulfill the promise of integrated services, investment in research and quality improvement efforts are essential to ensure that the treatments aimed to improve health for the child and the family as a whole can be substantiated and supported by health care systems and payers.

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Dr. Cordaro received his bachelor degree in Psychology from the University of Texas, and his medical degree from the University of Texas–Southwestern Medical School. He completed his general adult residency and child and adolescent psychiatry fellowship at the University of Colorado/Children's Hospital Colorado, where he served as Chief Child Psychiatry Fellow. In addition, he was selected as a Doris Duke Clinical Research Fellow during medical school along with completing the Developmental Psychobiology Research Group 2-year postdoctoral research fellowship.

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Emily Edlynn, PhD is an assistant professor of psychiatry at the University of Colorado School of Medicine, and serves as the Clinical Program Director for the Medical Day Treatment (MDT) program at Children's Hospital Colorado. Dr. Edlynn oversees program development activities to maximize overall service delivery in the MDT program, and provides individual, group, and family therapy for children and adolescents struggling with chronic and life-threatening medical illnesses. Dr. Edlynn has a background in pediatric pain and palliative care, helping to develop the palliative care service at Children's Hospital Los Angeles (CHLA). Dr. Edlynn has taught medical residents and psychology trainees in palliative care, grief and bereavement, and non-pharmacological pain management. Dr. Edlynn's research has focused on program development and palliative care. As part of the palliative care team, Dr. Edlynn received the Humanism Award at CHLA.

Dr. Edlynn received her bachelor degree in English from Smith College, and her doctoral degree in Clinical Psychology from the Loyola University of Chicago. She completed a postdoctoral fellowship in Pediatric Psychology at Children's Hospital Orange County.

Guido K.W. Frank, MD; Author

Guido K.W. Frank, MD is an assistant professor of psychiatry and neuroscience at the University of Colorado School of Medicine, and serves as Attending Psychiatrist and Associate Director on the Eating Disorders Program at Children's Hospital Colorado. Dr. Frank provides direct patient care to patients and their families admitted to the inpatient, partial hospital, and outpatient levels of care. Dr. Frank also provides supervision to residents and other staff in the Eating Disorders Program, and psychotherapy supervision to child and adolescent psychiatry residents.

Dr. Frank teaches both psychiatry residents and psychology interns in neurodevelopmental underpinnings of psychiatric disorders, which includes teaching methods such as brain imaging and genetics. Dr. Frank is the Director of the Developmental Brain Research Program, where his research focuses on the neurobiology of eating disorders and how brain function translates into the clinical presentation of individuals with disordered eating. Dr. Frank has received multiple awards, including various resident awards, a NARSAD award, and an NIH Minority Access to Research Career Program (NIMH) Mentor Recognition award. In addition, Dr. Frank has received grant funding from the NIMH for the past 6 years. After completing a K23 mentored award, he is now funded through an RO1 award.

Dr. Frank completed medical school at the Ludwig Maximilians University, Munich, Germany. He trained for 3 years in psychosomatics in the Roseneck Center for Behavioral Medicine, Prien, Germany. For the 3 years that followed, he was a visiting instructor at the Western Psychiatric Institute and Clinic, Eating Disorders Program, at the University of Pittsburgh. He completed Adult Psychiatric Residency at the Western Psychiatric Institute and Clinic, and then trained in child and adolescent psychiatry, and completed aT32 NIH research fellowship at the University of California, San Diego. Dr. Frank is board certified in both adult and child and adolescent psychiatry.

Robin Gabriels, PsyD; Reviewer

Robin Gabriels, PsyD is a licensed clinical psychologist, associate professor of psychiatry and pediatrics at the University of Colorado School of Medicine, Program Director for the Neuropsychiatric Special Care program, and psychiatric inpatient and day treatment unit for children with autism spectrum disorders (ASD) and/or intellectual disabilities at Children's Hospital Colorado. Dr. Gabriels has over 28 years of clinical experience developing intervention programs and treating a variety of pediatric and adult populations. Her current clinical/administrative responsibilities include pediatric individual, group, and family therapies and assessment services along with clinical program development and management. Dr. Gabriels mentors medical and psychiatry residents and supervises psychology postdoctoral fellows and interns. She is a certified autism diagnostic observation schedule-2 trainer, providing training to academic institutions across the U.S. She has published 2 edited books, and written articles and book chapters in the fields of autism, asthma, and art therapy. She has lectured and conducted workshops on ASD, both nationally and internationally. Dr. Gabriels' research focuses on ASD treatment outcomes and she is currently the PI on a 4-year project (currently in its third year) studying the Effects of Therapeutic Horseback Riding on Children and Adolescents with Autism (Project Number: 1R01NR012736-01). She is also the subcontract PI for a multi-site project funded by the Simons and Lurie Foundations, aiming to phenotype a population of ASD patients admitted to ASD specialty psychiatric hospital units. Dr. Gabriels was honored with the 2013 Alumni Master Scholar Award by the University of Denver's Graduate School of Professional Psychology.

Dr. Gabriels received her bachelor degree in Psychology from University of Northern Colorado, her master degree in Art Therapy from Vermont College of Norwich University, and her doctoral degree in Clinical Psychology from the University of Denver. She completed her postdoctoral training in autism and neurodevelopmental disabilities at the University of Colorado-JFK Partners.

Jennifer Hagman, MD; Author, Reviewer

Jennifer Hagman, MD is an associate professor of psychiatry at the University of Colorado School of Medicine. She is board certified in both child and adolescent psychiatry and general psychiatry. She has been the Medical Director of the Eating Disorder Program at Children's Hospital Colorado since 1993, and has integrated evidence-based clinical approaches and a comprehensive research component into the

program, which provides a family-centered approach to parent-supported nutrition and recovery. She is also the Administrative Medical Director of medical–psychiatric clinical services at Children's Hospital Colorado. She is a past president of the Colorado Psychiatric Society, Colorado Child and Adolescent Psychiatric Society, and Eating Disorder Professionals of Colorado. She supervises psychiatry residents and gives lectures and presentations at the University, in the community, and at national and international meetings. Her research is focused on factors related to the onset, course of illness, and recovery from anorexia nervosa. She has published many research articles and chapters, and is an expert in the diagnosis and treatment of eating disorders in childhood and adolescence. She has received the Dane Prugh award for Distinguished Teaching in Child Psychiatry, the Outstanding Achievement Award from the Colorado Psychiatric Society, the Faculty Award for Mentorship for the Child and Adolescent Psychiatry Residency Class of 2013, was recognized as a *Woman of Distinction* by the Mile High Girl Scouts organization, and was the keynote speaker for the 2008 North American Leadership Conference (NALC) of Children's Hospitals.

Dr. Hagman received her bachelor degree in Molecular, Cellular, and Developmental Biology (MCDB) and Psychology from the University of Colorado Boulder, and her medical degree from the University of Kansas. She completed her psychiatry residency training, and child and adolescent psychiatry fellowship at the University of California-Irvine.

Jenny Lindwall, PhD; Author

Jennifer Lindwall, PhD is an assistant professor of psychiatry at the University of Colorado School of Medicine. She is a pediatric psychologist with the Cystic Fibrosis Center, Department of Pulmonary Medicine, and the Child Psychiatry Consultation-Liaison Service at the Children's Hospital Colorado. Dr. Lindwall provides consultation and intervention to promote positive psychosocial functioning in children with significant medical illness, and has worked with a number of pediatric populations including children diagnosed with cystic fibrosis, multiple sclerosis, cancer, sickle cell disease, and spinal cord injury. Dr. Lindwall's clinical, teaching, and research interests are focused on psychosocial issues affecting children with chronic medical illness, including social-emotional health; adjustment, stress, and coping related to medical illness; quality of life; family functioning; and factors contributing to resiliency while facing the challenges of chronic illness. At Children's Hospital Colorado, Dr. Lindwall is particularly dedicated to working with pediatric patients with cystic fibrosis and multiple sclerosis, and creating integrated psychology services for patients and their families. She is also interested in effectively integrating cultural diversity into clinical care, and serves as Co-Chair for the Diversity and Inclusion Committee in the Department of Psychiatry.

Dr. Lindwall received her bachelor degree in Psychology, master degree in Counseling, and PhD in Counseling Psychology from the University of Wisconsin-Madison. She completed her predoctoral internship at the Temple University Health Sciences Center/ Shriners Hospitals for Children in Philadelphia, P.A., with a focus on pediatric and health psychology. Dr. Lindwall's postdoctoral fellowship training focused on clinical intervention and research with pediatric oncology/hematology patients at St. Jude Children's Research Hospital in Memphis, TN.

Susan Lurie, MD; Author

Susan Lurie, MD is a clinical associate professor of psychiatry at the University of Colorado School of Medicine, and is currently supervising and seeing patients in the Psychiatric Day Treatment Program. Dr. Lurie has extensive clinical experience in all levels of psychiatric care, and is an expert in the evaluation and treatment of youth with anxiety disorders, mood disorders, and psychosis. She has a private practice in the community and also consults to Denver Children's Home, a residential treatment center for youth with early trauma and significant behavioral and emotional difficulties. Dr. Lurie has been involved in residency training for many years, and in addition to providing individual supervision, she is the Co-Director of the Psychopathology and Psychopharmacology course for the first-year child residents. In 2013, she received the Dane G. Prugh Award for *Outstanding and Inspirational Teaching*. Dr. Lurie worked for many years in the Psychiatric Research Center as a primary and sub-investigator on numerous industry-sponsored clinical medication trials. Since 2010, she has served as the Colorado Delegate to the Assembly, American Academy of Child and Adolescent Psychiatry (AACAP), and she is a past president (2010) of the Colorado Child

and Adolescent Psychiatric Society (CCAPS).

Dr. Lurie received her medical degree from the University of the Witwatersrand, Johannesburg, South Africa. She completed her adult psychiatry residency training at St Lukes Roosevelt Medical Center, New York, and child psychiatry training at Columbia University, College of Physicians and Surgeons, New York.

Christine McDunn, PhD; Author

Christine C. McDunn, PhD is a senior instructor of psychiatry at the University of Colorado School of Medicine, and serves as both the Associate Director of Training for Psychology, and as a psychologist in the Stress & Anxiety Program at Children's Hospital Colorado. Dr. McDunn is the primary supervisor and administrator of the Psychology Practicum Program at Children's Hospital Colorado. She is responsible for providing both individual and group therapy for individuals with anxiety and related disorders, and oversees the training component of the Anxiety Program. Dr. McDunn co-leads a class on supervision for the psychology predoctoral interns, and leads a course for cognitive behavioral therapy for anxiety and related disorders in a course for psychology interns and child and adolescent psychiatry residents. Dr. McDunn recently was recognized for *Exemplary Teaching* by the psychology predoctoral interns. Dr. McDunn's research focuses on evaluating treatment outcomes for anxiety disorders.

Dr. McDunn received her bachelor degree in Psychology from The University of Texas at Dallas, and her doctoral degree in Clinical Psychology from the University of Denver. She completed a postdoctoral fellowship in anxiety disorders and pediatric psychology at Children's Hospital Colorado.

Scot McKay, MD; Author

Scot McKay, MD is an assistant professor at Denver Health Behavioral Health Services, and serves as an attending psychiatrist in the School-Based Health Clinics throughout Denver Public Schools, at the Family Crisis Center (FCC), and in the Outpatient Child Psychiatric Clinic at Denver Health. Dr. McKay provides psychiatric care to students in the Denver Public Schools, residents of the FCC, and outpatients at the Denver Health clinic, and collaborates with the social workers, psychologists, nurse practitioners, physicians, and other medical care providers who work in these clinics. Dr. McKay facilitates the Basics Psychiatry course to small group of first and second-year medical students at the University of Colorado School of Medicine, teaching students about mental illness, and honing their medical interviewing skills through discussion and interviewing patients with psychiatric diagnoses. Dr. McKay is also involved in policy making and legislative affairs as an executive committee member of the Colorado Child and Adolescent Psychiatric Society. He is a fellow of the American Psychiatric Association.

Dr. McKay is involved in research that examines the effectiveness of school-based mental health care, and the improvement of the screening and referral process for those with mental health issues to school-based health care.

Dr. McKay received his bachelor degree in Biology at Wofford College, and his medical degree at the Medical University of South Carolina. He completed his residency and fellowship training in both general and child and adolescent psychiatry at the University of Colorado, and is board certified in the aforementioned specialty and subspecialty.

Benjamin Mullin, PhD; Author, Reviewer

Benjamin Mullin, PhD is an assistant professor of psychiatry at the University of Colorado School of Medicine, and serves as a psychologist in the outpatient clinic at Children's Hospital Colorado. Dr. Mullin leads the Child Anxiety Intensive Outpatient Program (AIOP), providing short-term, evidence-based group therapy to youths with acute and disabling anxiety. Dr. Mullin also provides training for clinical psychology externs and interns on evidence-based treatments for anxiety, tics, and sleep disorders. Dr. Mullin's research focuses on the pathophysiology of anxiety disorders among youth, and in particular, how sleep disruption may precipitate emotion dysregulation by altering activity in key neural circuits. He is also pursuing research to develop and evaluate novel interventions for child-onset anxiety disorders.

Dr. Mullin received his bachelor degree in Psychology from Clark University, and his master and doctoral degrees in Clinical Psychology from the University of California, Berkeley. He completed a 2-year research fellowship in sleep medicine and translational neuro-

science at the University of Pittsburgh School of Medicine. He completed a 1-year fellowship in pediatric anxiety disorders at Children's Hospital Colorado.

Emily Fazio Muther, PhD; Author

Emily Fazio Muther, PhD is an assistant professor of psychiatry and pediatrics at the University of Colorado School of Medicine, and serves as a licensed pediatric psychologist at the Children's Hospital Colorado (CHCO). Dr. Muther works primarily on the Psychiatry Consultation and Liaison Service and in integrated primary care in the Child Health Clinic at CHCO. Additionally, Dr. Muther serves as the psychologist in the Integrative Headache Clinic in the department of Neurology at CHCO. Dr. Muther is responsible for providing consultative services to pediatric patients and their families who are admitted for inpatient medical hospitalization, and works primarily with patients with chronic medical illness to address issues related to adherence to medical care, coping with illness, and improvement of overall quality of life. She also provides clinical care to pediatric patients seen in primary care at CHCO, and is a supervising psychologist within Project CLIMB (Consultation and Liaison in Mental Health and Behavior). Dr. Muther provides supervision and training to a wide variety of trainees within the hospital, including psychology trainees, psychiatry fellows, pediatric residents, and medical students, and regularly gives didactic instruction as part of the training programs within the departments of psychiatry and pediatrics. Dr. Muther's research currently focuses on utilizing clinical informatics to evaluate the services provided in an integrated mental health program within primary care, and examining health and behavior-related outcomes for patients and families seen as part of the integrated primary care program at CHCO. Additionally, Dr. Muther has research interests and experience in improving and predicting the factors related to long-term quality of life in pediatric patients living with chronic medical illness.

Dr. Muther received her bachelor degree in Honors Psychology from the University of Iowa. She completed a terminal master degree in Clinical Psychology from the University of Denver, and a doctoral degree in Counseling Psychology from the University of Denver. She completed her predoctoral internship in pediatric psychology at Harvard Medical School and Children's Hospital Boston, and her postdoctoral fellowship in integrated pediatric primary care at Children's Hospital Colorado.

Douglas K. Novins, MD: Author, Reviewer, Editor-in-Chief

Douglas K. Novins, MD is the Cannon Y. & Lydia Harvey Chair in Child and Adolescent Psychiatry, and Chair of the Department of Psychiatry & Behavioral Sciences at Children's Hospital Colorado. He is also Professor of Psychiatry and Community & Behavioral Health at the University of Colorado Anschutz Medical Campus. Dr. Novins serves as the leader of child and adolescent behavioral health at Children's Hospital Colorado and the University of Colorado Anschutz Medical Campus, leading the ongoing development of a diverse set of clinical, training, and research programs with over 50 faculty and 250 staff. Dr. Novins' expertise is in the areas of adolescent substance-related problems and traumatic experiences, particularly among American Indian and Alaska Native youth. He is also Deputy Editor of the *Journal of the American Academy of Child & Adolescent Psychiatry*, the highest ranked publication in child and adolescent psychiatry.

Dr. Novins received his bachelor degree in History and Premedical Studies from Columbia College, and his medical degree from Columbia University's College of Physicians and Surgeons. He trained in general psychiatry at New York University/Bellevue Hospital, and in Child and Adolescent Psychiatry at the University of Colorado. The National Institute of Mental Health supported Dr. Novins' research training at the University of Colorado through a postdoctoral research fellowship in developmental psychobiology, and a career development award in mental health services research.

Phil O'Donnell, PhD; Author

Philip C. O'Donnell, PhD is an assistant professor of psychiatry at the University of Colorado School of Medicine. He is the Clinical Director for the Intensive Psychiatric Services program in the Pediatric Mental Health Institute at Children's Hospital Colorado. He has also served as a psychologist in the Neuropsychiatric Special Care Program, an inpatient and partial hospitalization program for children and adolescents with Autism Spectrum Disorders (ASD) and intellectual disabilities (ID) who are experiencing an emotional

or behavioral crisis. Dr. O'Donnell has specialized training in the forensic assessment of children and families. He is actively involved in the psychology externship and internship training programs, supervising trainees during their rotation in the intensive services programs. He co-directs a course on advanced topics in psychological assessment and regularly provides lectures on risk assessment and forensic evaluations with court-involved youth. His research interests are related to risk assessment and management of youth within psychiatric treatment settings, and violence risk assessment of youth with developmental and intellectual disabilities.

Dr. O'Donnell received his bachelor degree in Psychology from Creighton University, his master degree in Jurisprudence (child and family law) from Loyola Univeristy Chicago's School of Law, and his doctoral degree in Clinical Psychology from Loyola University Chicago. He completed a postdoctoral fellowship in forensic psychology at the University of Southern California's Institute of Psychiatry, Law, and Behavioral Sciences.

Alyssa Oland, PhD; Author, Reviewer, Editor

Alyssa Oland, PhD is an assistant professor at the University of Colorado Department of Psychiatry and Behavioral Sciences, and at National Jewish Medical and Research Center. She has worked on the Intensive Services Treatment Unit (inpatient psychiatric unit and psychiatric day treatment program), the Consult-Liaison Service, and in the outpatient clinic at Children's Hospital Colorado. Her areas of clinical focus are youth with co-occurring medical and psychiatric diagnoses, family issues, and serious mental illness in children and adolescents. Dr. Oland is responsible for providing individual, family, and group therapy. She also actively collaborates with schools, community providers, and multi-disciplinary professionals in providing care for her patients. Dr. Oland is principal investigator on a research project aimed at learning more about serious mental illness in youth and interventions to best help this population. Additional research interests include posttraumatic growth, quality of life, and family functioning in youth and families affected by co-occurring medical and psychiatric illness. Dr. Oland co-leads a didactic for predoctoral interns on the process of supervision, and also participates as a co-facilitator in the IPED multidisciplinary ethics course offered through the School of Medicine.

Dr. Oland received her bachelor degree in Psychology from Emory University, and her doctoral degree in Clinical Psychology and Developmental Psychology from the University of Pittsburgh. She completed a predoctoral internship in child clinical psychology at Lucile Salter Packard Children's Hospital of Stanford and the Children's Health Council. She completed a postdoctoral fellowship in clinical child psychology at Children's Hospital Los Angeles.

Jennifer J. Paul, PhD; Author

Jennifer J. Paul, PhD is an assistant professor of psychiatry and the Training Director of the Harris Program in Child Development and Infant Mental Health at the University of Colorado School of Medicine. Dr. Paul is a licensed clinical psychologist, and the Clinical Director of the Healthy Expectations Perinatal Mental Health Program at Children's Hospital Colorado, which provides psychiatric evaluation and group therapeutic support for mothers experiencing pregnancy-related depression and/or anxiety and their babies. Also, after many years of functioning as the Clinical Coordinator for the Kempe Therapeutic Preschool, she is now the Director of the Kempe CARES for Child Care program. Kempe CARES provides training, consultation, and reflective support to child care providers and center directors in effort to prevent various forms of childhood abuse and neglect, including Shaken Baby Syndrome. Dr. Paul leads classes on infant and early childhood development as well as parent-child interaction for child and adolescent psychiatry residents. She also leads courses in infant and early childhood screening and assessment as well as diversity-informed practice in infant mental health for postdoctoral psychology fellows in the Harris program. Dr. Paul also provides outpatient therapeutic services as an infant and early childhood mental health specialist through Children's Hospital Colorado to children ages birth through 5 years old and their families.

Dr. Paul received her bachelor degree in Psychology from the University of Wisconsin–Madison, and her master and doctoral degrees in Clinical Psychology from the University of Connecticut at Storrs. She completed her predoctoral internship at the Institute of Living/Hartford Hospital/Connecticut Children's Medical Center, and a postdoctoral fellowship in infant and early childhood development and mental health with the Harris Program at the University of Colorado School of Medicine.

John Peterson, MD; Author

John Peterson, MD is an attending psychiatrist in the Emergency Department at Children's Hospital Colorado. As an associate professor of psychiatry at the University of Colorado School of Medicine, Dr. Peterson was also the Director of Child and Adolescent Psychiatric Services at Denver Health, retiring after 20 years of clinical service, research, and teaching. He is currently providing emergency psychiatric evaluations of children and adolescents in the emergency department, and he supervises psychiatric crisis assessments completed by mental health clinicians in the ED. He also provides psychiatric consultation to pediatricians, and clinical supervision and teaching for child and adolescent psychiatry fellows. Dr. Peterson also teaches classes for the child psychiatry fellowship program and coordinates the child psychiatry grand rounds.

Dr. Peterson received his bachelor degree in Biology and Psychology from the University of California, Santa Cruz, and his medical degree at the University of California, San Francisco School of Medicine. He completed his residency training in psychiatry at the University of Colorado School of Medicine, where he also completed a child and adolescent psychiatry fellowship.

Gautam Rajendran, MD; Author

Gautam Rajendran, MD is a senior instructor of psychiatry at the University of Colorado School of Medicine, and serves as an attending psychiatrist on the Inpatient and Day Treatment Psychiatric Services for Children and Adolescents at Children's Hospital Colorado. He provides psychiatric assessments, treatment planning, medication management, and psychotherapy services. Dr. Rajendran also supervises general psychiatry residents, child and adolescent psychiatry fellows, and medical students during their inpatient psychiatry rotations. He regularly gives lectures for cross-discipline training at Children's Hospital, and serves as the Program Committee Chair of the Colorado Child and Adolescent Psychiatric Society. Dr. Rajendran's fields of interest include thought disorders, psychosis, and attention deficit disorder in children and adolescents. He conducts lectures on childhood onset psychosis and psychopharmacology, and directs the Systems of Care in Child Psychiatry course.

Dr. Rajendran received his bachelor degree in Medicine and Surgery from Jawaharlal Institute of Post Graduate Medical Education and Research, Pondicherry, India. He completed his general psychiatry residency at Southern Illinois University, Springfield IL., and his child psychiatry fellowship at University of Colorado, Denver.

Paula Riggs, MD; Author

Dr. Paula Riggs, MD is Professor and Director of the Division of Substance Dependence in the Department of Psychiatry at the University of Colorado School of Medicine, and board certified in child, adolescent, and addiction psychiatry. Her research focuses on improving treatment for adolescents with co-occurring psychiatric and substance use disorders, including among the first randomized, controlled medication trials in such youth. Dr. Riggs and her research team have more recently developed an integrated mental health and substance treatment intervention known as Encompass, based on more than 15 years of NIDA-funded research. Dr. Riggs also has a career-long commitment to teaching and mentoring junior investigators. She is currently the Principal Investigator of the NIDA-AACAP K12: Physician Career Development Award, which provides addiction research training and mentorship to child and adolescent psychiatrists who wish to become career investigators in the field of addiction and mental health research.

Dr. Riggs received a number of honors and awards for her contributions to the field, including 2 American Academy of Child and Adolescent Psychiatry *Outstanding Mentor* awards, 5280 *Top Doctor* award, Science and Management of Addiction (SAMA) Foundation Research award, Katherine Ann Mullen Memorial Award for *Outstanding Contributions to the Field of Adolescent Health in the Rocky Mountain Region*, and the Elaine Schlosser Lewis Award for *Best ADHD Research and Paper Published in the Journal of the American Academy of Child/Adolescent Psychiatry*. She is featured in HBO's *Addiction*, and has appeared on the *Dr. Oz* show and other national media.

Dr. Riggs received her bachelor and master degrees in Biology, and her medical degree from the University of Colorado, Denver. She subsequently completed a medical internship (1989-1990), general psychiatry residency (1990-1992), and a child and adolescent psychiatry fellowship (1992-1994) at the University of Colorado School of Medicine.

Randal G. Ross, MD; Reviewer

Randal G Ross, MD is the L. McCarty Fairchild Chair in Child and Adolescent Psychiatry; Professor, Departments of Psychiatry and Pediatrics; and Director of Research and Research Training for the Department of Psychiatry at the University of Colorado School of Medicine. He is also Director of Medical Student Research Training for the University of Colorado School of Medicine. Dr. Ross focuses his research on the developmental pathway to major illness from conception to mid-adolescence. His work includes studies of children with and at-risk for schizophrenia using methodologies including electrophysiology, hormones, behavior, and novel prevention trials.

Dr. Ross received his bachelor degree in Physiological Psychology from the University of California, Santa Barbara, and his medical degree from Yale University. He completed general and child and adolescent psychiatry residencies at the University of Washington, and a postdoctoral research fellowship at the University of Colorado School of Medicine.

Elise M. Sannar, MD; Author, Reviewer, Editor

Elise M. Sannar, MD is a senior instructor of child and adolescent psychiatry at the University of Colorado School of Medicine, practicing at Children's Hospital Colorado. Dr. Sannar is one of 2 attending psychiatrists on the Neuropsychiatric Special Care Unit (NSC), an intensive inpatient and day treatment program for children and adolescents with comorbid psychiatric and developmental issues. She is involved in multiple subspecialty clinics in the hospital, including the Prader Willi Multidisciplinary Clinic, the 22q11.2 Deletion Syndrome Clinic, and the Sie Center for Down Syndrome. She has also participated in national research studies looking at the effects of novel agents on the core behavioral phenotype of Fragile X Syndrome. In addition to managing her subspecialty clinic patients, Dr. Sannar sees other outpatients for on-going medication management. Dr. Sannar brings her passion for serving special needs patients to her teaching of fellows and residents. She provides direct supervision to residents rotating through the NSC unit, and lectures to general psychiatry residents, child and adolescent psychiatry fellows, and developmental pediatrics fellows.

Dr. Sannar received her bachelor degree in Women's Studies and Chemistry from Pomona College, and her medical degree at the University of Chicago. Her residency and fellowship trainings occurred through the University of Colorado School of Medicine.

Mindy Solomon, PhD; Author

Mindy Solomon, PhD is an assistant professor of psychiatry at the University of Colorado School of Medicine, and serves as a psychologist and clinical program director for the Eating Disorders Program at Children's Hospital Colorado. Dr. Solomon is responsible for providing direct clinical care by means of individual, family, and group therapy, as well as program development and milieu mentorship for the therapeutic milieu program. Dr. Solomon is the primary supervisor on the Eating Disorder Program for psychology interns and postdoctoral fellows, and leads seminars for postdoctoral fellows on issues related to eating disorder treatment, ethics, and professional development. She also gives talks in community settings (eg, schools, and gifted and talented organizations) on the identification and treatment of eating disorders in children and adolescents. Dr. Solomon's research focuses on improving outcomes for families entering the Eating Disorder Program, as well as studying novel treatments to enhance the treatment of eating disorders.

Dr. Solomon received her bachelor degree in Psychology from the University of California, Santa Cruz, her master degree in Clinical Health Psychology from California State University, Northridge, and her doctoral degree in Clinical Psychology from the California School of Professional Psychology at Alliant International University. She completed a postdoctoral fellowship in eating disorders treatment at Wardenburg Health Center, University of Colorado Boulder.

Celest St. John-Larkin, MD; Author

Celeste St. John-Larkin, MD, is The Anschutz Chair in Healthy Expectations, and assistant professor of Psychiatry at the University of Colorado School of Medicine. She is the Medical Director for the Healthy Expectations Perinatal Mental Health Program at Children's Hospital Colorado. Dr. St. John-Larkin is passionate about caring for women and infants during the perinatal period. The program provides group therapy support for pregnant women and those with postpartum mood and anxiety disorders while ad-

dressing the relationship between mothers and their infants. Dr. St. John-Larkin also provides psychiatric evaluations and mediation management to women in this program, as well as preconception and pregnancy consultation for women taking psychotropic medications from across the state. She also provides services to children and adolescents in outpatient clinic at the Pediatric Mental Health Institute. With an interest in working with young children and their families, Dr. St. John-Larkin has additional training in child-parent psychotherapy and infant mental health. She also works in Project CLIMB as a consultant and preceptor for pediatric residents in the Child Health Clinic at Children's Hospital Colorado. She has given lectures in the community on adolescent and pregnancy-related depression, and supports community pediatric practices in addressing the mental health needs of their patients through the CAPA project. Previously, she worked on the inpatient and day treatment services at Children's Hospital Colorado. Dr. St. John-Larkin is a course coordinator in the child and adolescent psychiatry fellowship, and supervises residents during inpatient and elective rotations. She serves on the executive committee of the Colorado Child and Adolescent Psychiatric Society, and was appointed to the Colorado Department of Public Health and Environment's Pregnancy-Related Depression State Advisory Committee in 2014. She is also a founding member of the Children's Hospital Colorado Mental Health Family Advisory Council.

Dr. St. John-Larkin received a bachelor degree in History from Northwestern University, and her medical degree from Michigan State University, College of Human Medicine. She completed her internship and residency in adult psychiatry, and fellowship in child and adolescent psychiatry at the University of Colorado School of Medicine and Children's Hospital Colorado.

Sally Tarbell, PhD; Author, Reviewer

Sally Tarbell, PhD is an associate professor of psychiatry and pediatrics at the University of Colorado School of Medicine, and serves as the Chief of Pediatric Psychology at Children's Hospital Colorado. She is the Director of the Psychology Postdoctoral Fellowship Program. Dr. Tarbell provides clinical care to pediatric patients seen in the Motility and Inflammatory Bowel Disease programs in the Digestive Health Institute at CHCO. Dr. Tarbell contributes lectures to the pediatric, psychology, and psychiatry training programs on pediatric psychology topics. She serves as a scientific advisor to the International Cyclic Vomiting Syndrome Association. Dr. Tarbell's research focuses on the development of behavioral medicine interventions, and the assessment and treatment of psychiatric comorbidity in children and adolescents with functional medical disorders, including cyclic vomiting syndrome, nausea, postural orthostatic tachycardia syndrome, migraine, and abdominal pain.

Dr. Tarbell received her bachelor degree in Psychology from Trinity College, and her doctoral degree in Clinical Counseling Psychology from York University, Toronto, Ontario. She completed a postdoctoral research fellowship in the social and behavioral sciences at Harvard Medical School and Children's Hospital, Boston.

Marianne Z. Wamboldt, MD; Reviewer

Marianne Z. Wamboldt, MD is a professor of psychiatry at the University of Colorado, the Vollbracht Family Endowed Chair of Stress and Anxiety Disorders, the Medical Director of the Psychosocial Research Center, and the Medical Director of the Anxiety Disorders Program, all at Children's Hospital Colorado. She has been a board certified Child and Adolescent Psychiatrist for over 25 years. In addition to seeing outpatients in the CHCO clinic, she supervises and teaches child and adolescent psychiatry residents. She is the President of the Family Process Institute, an international group dedicated to promoting research, training, and clinical care regarding families.

Dr. Wamboldt received her medical degree and completed her general psychiatry residency at the University of Wisconsin Madison; she completed a clinical research fellowship at the NIMH, followed by several years of work in the NIMH Extramural Program; she completed her child and adolescent psychiatry residency at the University of Colorado.

Jason Williams, PsyD, MS Ed;
Author, Reviewer

Jason Williams, PsyD, MSEd is an assistant professor of psychiatry at the University Of Colorado School of Medicine, and serves as Clinical Director and Director of Training in the Pediatric Mental Health Institute at the Children's Hospital Colorado. Dr. Williams has an interest in the development of innovative teaching methodologies in inter-professional teams. Clinically, his interests lie in the use of technology both for clinical outcomes and in the development of transdiagnostic service delivery. He enjoys working with children and families clinically where he focuses on people with impulse control disorders.

Dr. Williams is the past president of the Colorado Psychological Association, and the Chair of the Association of Predoctoral and Postdoctoral Internship Centers (APPIC). Dr. Williams received his master degree in Education from the University of Southern California, and his doctoral degree from the California School of Professional Psychology in Los Angeles, California. He completed an internship and postdoctoral training program at the Children's Hospital in Los Angeles. He worked at that institution for 12 years prior to returning home to Colorado.

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About the University of Colorado School of Medicine Department of Psychiatry

The University of Colorado School of Medicine is ranked in the top 10 by U.S. News & World Report—in multiple medical specialties. Located on the Anschutz Medical Campus in Aurora, Colorado, the School of Medicine shares its campus with Children's Hospital Colorado and University of Colorado Health.

The Department of Psychiatry provides clinical services through the Addiction Treatment Services, Children's Hospital Colorado, University of Colorado Hospital, and in conjunction with Denver Health Medical Center and the Denver Veterans Administration Hospital. The Department of Psychiatry training programs encompass a full spectrum of educational levels (from medical student and residency education through postdoctoral fellowships) and mental health disciplines (eg, psychology, psychiatry, social work, and nursing), and are widely recognized for their consistent high quality.

With 167 full-time and 366 volunteer faculty members, the Department of Psychiatry is one of the largest in the United States. Its residency program also ranks among the largest programs, with 45 residents and over a dozen fellows. Many of our faculty have positions of leadership in national organizations, including the American Psychiatric Association, the American Psychological Association, and the American Academy of Child and Adolescent Psychiatry.

In terms of research, the Department of Psychiatry regularly ranks as one of the top 3 on the University of Colorado Anschutz Medical Campus, and was recently ranked 13th in the nation for research funding. It is also one of the strongest centers in the Veteran's Administration for funding in mental health research. The breadth and depth of scientific accomplishments span the neurosciences, developmental neurobiology, addictions, infant development, child and adolescent psychiatry, behavioral immunology, schizophrenia, depression, transcultural, and public psychiatry.

Recent research awards, investments in clinical services, and teaching by both our affiliated institutions and the philanthropic community have strengthened and enlarged our existing programs as we continue our commitment to a biopsychosocial model, medical and psychiatric education, an interdisciplinary research approach, and the provision of clinical services.

About the Division of Child and Adolescent Psychiatry

As one of the oldest and most-respected academic programs in children's mental health in the nation, the Division of Child and Adolescent Psychiatry supports a wide range of clinical, teaching, and research programs. The Division is particularly well-known for advancing the science and practice of children's mental health in the areas of addictions, anxiety, autism spectrum disorders, underserved populations, eating disorders, integrated care, psychosis and early-onset schizophrenia, psychosomatic medicine, stress and trauma, and telemental health.

The Division of Child and Adolescent Psychiatry combined efforts with Children's Hospital Colorado in 2002 to develop what is now the Pediatric Mental Health Institute. Children's Hospital Colorado sees, treats, and heals more children than any other hospital in the region, providing integrated pediatric health care services at the Anschutz Medical Campus as well as 16 other locations along Colorado's Front Range. The hospital is nationally ranked as a leader in pediatric care, consistently recognized by U.S. News & World Report as one of the top 10 children's hospitals in the nation.

The Pediatric Mental Health Institute provides a complete continuum of psychiatric services, including outpatient, emergency, partial hospitalization, and inpatient services with an emphasis on developing coordinated systems within the hospital as well as collaborating with other agencies and providers. Our interdisciplinary faculty and staff includes psychiatrists, psychologists, social workers, and nurses. The institute is in the midst of a major expansion that is touching all levels of clinical care, teaching, research, and scholarship, assuring its continued place as one of the nation's leading centers for children's mental health.