

A Team-Based Collaborative Care Model for Youth With Attention-Deficit Hyperactivity Disorder in Education and Health Care Settings

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Abstract

Attention-deficit hyperactivity disorder (ADHD) is among the most commonly diagnosed disorders of children and youth. Young people receive their ADHD diagnoses and medical treatment in primary health care settings and can experience a range of behavioral and educational disabilities treated in the clinic, at home, and at school. We propose a team-based collaborative care model (TBCCM) to foster communication and collaboration among health care and education teams, embedding implementation science methods to promote and sustain evidence-based practices for youth with ADHD. Key features of the model include (a) effective leadership and teamwork within the two universal systems of education and health care, (b) use of data from multiple informants who describe and monitor student behavior within and across contexts, and (c) adoption and adaptation of evidence-based practices. We expect that these efforts to embed implementation science methods within a collaborative team structure will improve the uptake of evidence by intervention teams in the two systems, and thus optimize outcomes for children and youth with ADHD.

Keywords

ADD/ADHD, disorders/disabilities, interagency, collaboration, integrated, services of care, system(s), implementation science

Youth with attention-deficit hyperactivity disorder (ADHD) can experience complex problems requiring comprehensive interventions across contexts, including home and school (Fabiano & Pyle, 2019). They are likely to demonstrate poor self-regulation and deficits in key executive functions (e.g., inhibitory control and working memory) and can experience a variety of co-occurring conditions, including aggression, depression, anxiety, and learning disabilities (Hinshaw & Arnold, 2015). Students with ADHD comprise approximately 10% to 12% of the population of youth (American Psychiatric Association [APA], 2013; Danielson et al., 2018). The percentage of youth identified with ADHD has doubled over the course of the past 20 years according to parent surveys (National Health Interview Survey, 2018), with approximately 90% of youth with ADHD receiving diagnoses from health care providers and 70% of youth with ADHD receiving educational services (DuPaul et al., 2019).

Youth with ADHD receive services in general or special education settings, with or without special education identification, overseen by a multi-tiered systems of support (MTSS) team (DuPaul et al., 2019; Fabiano & Pyle, 2019).

Complicating the delivery of services for students with ADHD is the involvement of health care professionals who work outside the school system, often in teams coordinated by case managers and including some combination of nurses, nurse practitioners, primary care physicians, physician assistants, psychiatrists, or psychologists (Barbarese et al., 2020; Bruns et al., 2016; Power et al., 2016). Despite evidence for and availability of home- and school-based interventions for youth with ADHD, cross-setting interventions for these youth are under-employed (DuPaul et al., 2019). Although parents have reported that 90% of youth with ADHD have ever received pharmacological treatment,

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only 30% of parents have ever received behavioral training (Danielson et al., 2018). In addition, only about 30% of students with ADHD have ever received classroom behavioral interventions, according to parent reports (DuPaul et al., 2019).

Although professionals from both health care and education are central to the treatment of children and youth with ADHD, there has been surprisingly limited communication and collaboration between professionals in the two systems (Guevara et al., 2005; Power et al., 2013). This pattern persists despite the finding that health care providers, parents, and teachers willingly share information about a given child's care when they have a method for doing so (Michel et al., 2018). In fact, there remain persistent barriers to effective collaboration among professionals from the education and health care systems, including (a) administrative and fiscal barriers, including time for collaboration, (b) conceptual and linguistic differences between professionals' training and practice, (c) differences in expectations for collaboration held by health care providers and educators, (d) limitations to collaboration associated with one's role in a given system, (e) absence of specific processes to coordinate care, (f) barriers associated with privacy laws in health care (Health Information Portability and Accountability Act, HIPAA) and education (Family Educational Rights and Privacy Act, FERPA), (g) lack of continuity in care for youth from year to year, and (h) lack of resources in some low-income communities and schools (Power et al., 2013).

The purpose of this article is to advance a model for addressing or ameliorating existing barriers to the comprehensive delivery of evidence-based assessment and intervention for children and youth with ADHD. In particular, we adapt existing models and methods from education and health care, which serve all children and youth, with a goal of enhancing collaboration among stakeholders from the two systems. Our team-based collaborative care model (TBCCM) is grounded in effective teamwork in both education and health care, involving multidisciplinary teams of professionals and family members. The model includes the following key features: (a) effective teamwork by members of education and health care teams, including interdisciplinary problem solving through ongoing communication and collaboration, (b) use of data from multiple informants who describe and monitor student behavior across contexts, and (c) use of implementation science methods by which teams adopt and adapt evidence-based practices. In this article, we provide an overview of the model, describe its key features, and outline directions for future research.

Contributions of the TBCCM

The collaborative care model has its origins in medicine, where researchers have redesigned mental health care to include a greater role for a variety of professionals in the

delivery of services (Lyon et al., 2016). These professionals include primary care providers, care or case managers, teachers, mental health specialists, and social workers (Kolko et al., 2014). Mental health services delivered through a collaborative care model with pediatric and mental health providers have resulted in improved clinical outcomes for children ages 17 and younger with depression, ADHD, and behavioral disorders in a systematic review of 11 randomized controlled trials (Yonek et al., 2020). Researchers in health care have adopted a collaborative care approach to the delivery of mental health services, due to the many desirable features of this system, such as the presence of familiar providers in a local context and the absence of stigma that can be associated with mental health care (Kolko & Perrin, 2014). In a randomized controlled trial comparing a doctors' office collaborative care model to a system of outside referrals for children with behavior problems, including ADHD, Kolko and colleagues (2012) identified significant improvements for those participating in the collaborative care model, including mental health service use and completion, improved behavior and emotional symptoms (according to parents), and improvement in behavioral goals for children and overall clinical response, according to clinic staff.

The TBCCM is designed to capitalize on the effectiveness of collaborative care models by embedding implementation science methods within the teamwork of education and health care professionals. As a result, the TBCCM improves upon the interconnected systems framework (ISF), which is also designed to integrate education and mental health services (Barrett et al., 2013; Weist et al., 2018). The ISF is organized at the community level and includes leaders from multiple agencies, such as family and disability advocacy and child welfare groups, juvenile justice, primary health care, and leaders from mental health agencies and schools (Weist et al., 2018). Each of these leaders is influential and is charged in the ISF with developing and implementing policy, allocating resources, and delivering services (Barrett et al., 2013; Splett et al., 2017; Weist et al., 2018).

However, by creating these organizational structures at the community level, the ISF may construct rather than reduce barriers to effective collaboration between education and mental health (see Power et al., 2013), especially with regard to administration and bureaucracy. We believe that employing the TBCCM with health care providers is likely to be a more nimble and effective partnership for integrating educational and mental health services, taking advantage of the two healthy contexts (school and health care) that are familiar, local, universal, and therefore, not stigmatizing. Indeed, evidence suggests that teams of practitioners are particularly well-suited to adopt the implementation science methods that are at the forefront of effective delivery of evidence-based practices (see Lyon, 2016; Powell et al., 2015). Thus, a particular strength of the

ISF, which we adopt in the TBCCM, is a focus on teamwork, including research, theory, and best practices for effective team functioning. Furthermore, the TBCCM leverages research and theory in implementation science to address barriers to collaboration identified by Power et al. (2013). In particular, we build upon specific structures already in place, including existing teams and their use of technology, to foster collaboration.

Effective Leadership and Teamwork

Effective leadership and teamwork are core structural features of the TBCCM, facilitating the delivery of evidence-based assessment and intervention. The conditions for effective teamwork have been identified by researchers in both health care (Bannister et al., 2014) and education (Splett et al., 2017). These conditions include specific procedures for strong team functioning, such as (a) establishing a clear purpose for the team, (b) defining roles and responsibilities for team members, including leadership roles and creating opportunities for everyone to participate, (c) starting and ending meetings on time and following an agenda, to which all team members may contribute, (d) maintaining high levels of attendance by all team members, (e) reviewing data for problem solving at each meeting, and (f) conducting action plans in a way that is data based and follows a problem-solving approach (Bannister et al., 2014; Splett et al., 2017).

MTSS Intervention Teams in Education

The MTSS intervention system, now required under federal law (Every Student Succeeds Act, 2016, Title IX, Sec. 8002(33)), provides the framework for educational interventions designed to enhance academic and social/emotional/behavioral success for all students. The MTSS approach to intervention includes both academic (Response to Intervention) and behavioral (Positive Behavioral Intervention and Supports) approaches and is a useful framework for guiding assessment and intervention in schools (Bruns et al., 2016; Freeman et al., 2015). In the MTSS system, young people with ADHD who have co-occurring academic and behavioral needs are likely to benefit from interventions delivered at Tiers 2 and 3 (DuPaul et al., 2019).

In the work of MTSS teams, no single professional makes decisions regarding the quality of assessment and intervention. Rather, the selection, delivery, and ongoing monitoring of effective interventions for students involve the coordination of a variety of team members, which include individuals in leadership roles (e.g., principals, assistant principals, and special education leaders and case managers) who work alongside professionals who provide direct services to students (e.g., special and general education teachers, social workers, school counselors, and school psychologists). In the TBCCM, the work of these team

members and their leaders is critical to the successful communication and collaboration among members of education and health care intervention teams. Leadership roles for school intervention teams are likely to be divided among school principals and special education leaders. Principals are responsible for allocating resources and providing a supportive organizational structure for the work of teams, where special education leaders are responsible for selecting and establishing a data collection system for the team to monitor student progress and keeping the team focused on adapting and intensifying evidence-based interventions (Forman & Crystal, 2015; Talbott et al., 2016). We argue strongly for the identification of leaders in the TBCCM who have specific roles in the intervention team.

For example, aligned with the TBCCM and critical to a successful collaboration with health care providers and their teams is the leadership role of case managers, who may be trained as special educators, social workers, counselors, or school psychologists. These individuals play a critical role in communicating with families and obtaining permission to share school data with health care providers through FERPA (see Power et al., 2016).

Health Care Intervention Teams

In health care settings, primary care physicians lead the intervention team, particularly in cases where ADHD is primarily managed in the office; however, when specialists become involved in care (e.g., developmental behavioral pediatricians, psychologists, and neurologists), then these specialists may adopt a leadership role. This flexibility-in-leadership is similar to that seen in educational intervention teams, including IEP teams (Talbott et al., 2016). Members of health care teams may also include nurses, nurse practitioners, clinical pharmacists, social workers, or counselors (Barbaresi et al., 2020). These health care providers directly interact with family members and coordinate sharing of information between family, health care, and education teams in compliance with HIPAA and FERPA (Power et al., 2016). This allows family members to become team members in the management of a child's ADHD. To improve communication and collaboration between professionals in health care and education and facilitate the use of evidence-based assessment and intervention across home and school contexts, Power and colleagues developed and refined the ADHD Care Assistant (Michel et al., 2018; Power et al., 2016). Other electronic systems exist, but they are not directly linked to the health care electronic system (Epstein et al., 2013).

The ADHD Care Assistant has four distinct features: (a) an electronic survey designed to collect data from parents and teachers, (b) a module visible to providers and integrated into the electronic health record (EHR) system, (c) a web service design to facilitate communication between

the shared data and the EHR, and (d) an e-mail-based platform for sharing data between parents and teachers (Michel et al., 2018; Power et al., 2016). One of the particular benefits of the ADHD Care Assistant is the opportunity it affords parents to select preferred treatments for the child, including medication and/or behavior therapy, and to share data among members of the health care team and with the child's teachers. Use of the ADHD Care Assistant also allows health care providers and families to set goals for treatment in the areas of school performance, relationships, and behavior (Power et al., 2016).

In their research on the effectiveness of the ADHD Care Assistant, Power and colleagues (2016) found that tracking ADHD symptoms and changes in symptoms over time using this tool was highly feasible. However, they also found that parents and teachers in urban communities were significantly less likely to use the tool than were parents and teachers in suburban communities (Power et al., 2016). To further improve and test the effectiveness of the ADHD Care Assistant, Michel and colleagues (2018) obtained feedback from stakeholders (parents, teachers, and pediatricians) about which data they preferred to share (i.e., goals for their children, as well as children's symptoms, educational performance, and medication side effects) and updated the tool accordingly. Michel and colleagues (2018) then studied the effectiveness of the ADHD Care Assistant as a communication tool, finding that among parents who used it, the majority (64%) agreed to share information with teachers; and in 80% of those cases, parents agreed to share all of the child's data. Parents of children who were younger, along with those who had more severe hyperactivity and greater impairment were significantly more likely to share data (Michel et al., 2018). Furthermore, 89% of parents who agreed to share data typically continued sharing at subsequent opportunities (Michel et al., 2018).

Although both parents and teachers had shared their data, parents viewed only 16% of surveys submitted by teachers and teachers only viewed 30% of surveys submitted by parents (Michel et al., 2018), raising the need for an explicit process, identified in the TBCCM, by which education and health care teams, including parents and teachers, can view and use data for ongoing decision making. We have thus included an explicit role for case and care managers in the TBCCM for data sharing; these individuals are responsible for using the ADHD Care Assistant, as well as other tools to facilitate the sharing of data and communication among families and professionals about treatment in the two systems.

Use of Data From Multiple Informants Across Settings

As mentioned previously, the TBCCM places a key emphasis on service delivery at the level of the children, youth,

and families receiving care. At the core of evidence-based practices at this level of service delivery are the assessments that guide decision-making (for a review, see De Los Reyes et al., 2017). Children and youth may display mental health concerns such as ADHD in a variety of ways both within and across key social contexts in their lives, such as home, school, and within peer interactions (e.g., Dirks et al., 2012; Pelham et al., 2005). In fact, a key component of effectively assessing and diagnosing ADHD involves measuring whether a student displays symptoms and impairments across relevant contexts and in at least two settings, such as school and home (APA, 2013). Consequently, best practices in evidence-based ADHD assessments involve collecting reports from informants who observe children and youth within and across these contexts, such as teachers and parents (Hunsley & Mash, 2007).

A considerable body of work now supports the idea that informants such as teachers and parents provide reports about child and youth behavior based, in part, on the contexts in which they observe these behaviors (for reviews, see; De Los Reyes, Lerner, et al., 2019; De Los Reyes et al., 2013). When coupled with the idea that children and youth may behave differently, depending on the social context, it logically follows that the data shared by members of education and health care teams should not only reflect relative levels of ADHD symptoms and associated impairments but also information germane to the context(s) in which ADHD symptoms and impairments manifest. For example, teachers may base their ratings on behavior observed in a variety of school settings, parents may base their ratings on behavior observed in the home and other settings, and health care providers may base their ratings on a combination of behavior observed in the clinic and the reports from parents and teachers (see also Kraemer et al., 2003). Consistent with these ideas surrounding cross-informant assessments, over five decades of research reveals that these informants' reports often yield inconsistent estimates of mental health concerns (i.e., *informant discrepancies*; Achenbach et al., 1987; De Los Reyes et al., 2015).

Despite the robust presence of informant discrepancies and the crucial importance of multi-informant assessments for determining cross-contextual ADHD symptoms and impairments, a historical trend involves the lack of concrete guidelines or standards for integrating informants' reports for ADHD assessment and intervention (see also Beidas et al., 2015). The consequences of this lack of guidance cannot be overstated. In particular, recent experimental work highlights that when confronted with discrepant reports, clinicians often use decision-making strategies or heuristics that lack evidentiary support (e.g., relying on data from the "most insightful" informant; Marsh et al., 2020). The result is that school and health care professionals require assessment and intervention paradigms that allow them to definitively, reliably, and validly use multi-informant assessments

to identify cross-contextual displays of children's ADHD symptoms and impairments. That is, multi-informant assessments may, in theory, allow school professionals to identify the specific contexts in which children display psychosocial difficulties associated with ADHD. However, in practice, we do not know how often school and health care professionals and their teams base ADHD diagnoses and ongoing assessment and intervention services on the cross-contextual evidence about ADHD symptoms and impairments that multi-informant assessments can provide. This creates considerable uncertainties for team effectiveness, communication, and collaboration (De Los Reyes, Cook, et al., 2019).

The TBCCM provides a useful framework for understanding and interpreting multi-informant assessments of ADHD. Indeed, we previously discussed how the model ascribes value to multiple stakeholders involved in service delivery. A logical extension of these ideas involves ascribing value to the experiences multiple informants have in observing the very symptoms and impairments targeted for service delivery. Collectively, the evidence suggests that parents and teachers report about child and youth mental health concerns in complementary ways, such that service providers learn more about these concerns from all informants' reports, over-and-above use of any one informant's report; they all have incremental value (De Los Reyes et al., 2015). Thus, the TBCCM is uniquely positioned to guide use and interpretation of the evidence commonly leveraged for decision making surrounding the delivery of services for children and youth experiencing ADHD.

For instance, MTSS teams might assess ADHD symptoms and impairments using brief screening tools, such as those incorporated into the ADHD Care Assistant described previously. In conjunction with these assessments, MTSS team members might conduct an independent assessment of characteristics of social contexts germane to patients' clinical presentations (e.g., risk and protective factors present at home, school, and other settings; with adults, siblings, and/or peers). The purpose of this assessment would be to identify "matches" between the outcomes of multi-informant assessments and the contexts implicated in the maintenance of ADHD symptoms and impairments (see also De Los Reyes, Lerner, et al., 2019). For example, to what degree do the differences between parent and teacher reports support the notion that environmental contingencies that elicit displays of ADHD symptoms and impairments manifest to a greater extent in one context (e.g., school) more so than another (e.g., home)? In essence, the TBCCM might facilitate incorporating informant discrepancies into case conceptualization, treatment planning, and progress monitoring. In particular, we expect the model to facilitate use of multi-informant assessments and understanding of informant discrepancies for selecting and implementing evidence-based practices appropriate to the context(s) in which children and

youth display ADHD symptoms and impairments (see also De Los Reyes, Cook, et al., 2019).

Implementation Science Methods

Implementation science refers to the practice of guiding professionals to adopt and integrate evidence-based practices in applied settings, including schools and health care settings (Lyon, 2016; Powell et al., 2015). Implementation science methods are direct and individualized for these settings and communities; they are explicitly designed to work in a particular setting, in contrast to approaches that are not particularly individualized or direct, such as the diffusion or dissemination of information, practices, and intervention materials to practitioners (Lyon, 2016).

Interventions selected for youth with ADHD must indeed be evidence-based, data-driven, delivered with fidelity, and adopted using implementation science methods (Fabiano & Pyle, 2019; Sugai & Horner, 2009). One approach to the adoption of evidence-based interventions is to support intervention teams in their adaptation of core elements of evidence-based practices (Sutherland et al., 2019). Examples of these core elements include establishing systems for regular communication between home and school; providing immediate and explicit feedback to students; providing contingent rewards and opportunities for youth to respond during class; and establishing clear and consistent classroom routines (Sutherland et al., 2019). Adapting and tailoring these (and other) core elements of evidence-based practices with the involvement of key stakeholders may facilitate the teams' responsiveness to the needs of youth with ADHD (Sundell et al., 2016). For example, there may be elements of evidence-based practices that work in both the home and school settings (e.g., providing contingent rewards for desired behavior) and those that are specific to school (e.g., providing instructional feedback and implementing peer tutoring with fidelity) or to home (e.g., establishing clear and consistent routines for homework completion and bedtime).

Teams can employ implementation science methods to ensure the adoption of evidence-based practices and ongoing assessment of their effectiveness across the two systems. Steps in the implementation science process include (a) explicit involvement of all stakeholders, including parents, in the discussion of a particular problem and selection of evidence-based interventions, (b) recruitment and ongoing training of and support for leaders who are champions for evidence-based practices, (c) promotion of adaptability among members of intervention teams and their leaders, (d) provision of ongoing consultation and coaching, and (e) systematic means of sharing data (Lyon, 2016; Powell et al., 2015). Following are examples of implementation science methods in health care and education that have already benefited young people with ADHD, learning, and

behavioral disabilities. In health care, Michel and colleagues (2018) developed and refined the ADHD Care Assistant using stakeholder input and provided parents with the opportunity to select among evidence-based interventions, such as medication or behavior therapy. In education, our colleagues with the National Center on Intensive Intervention (2020) have identified, trained, and supported special education leaders of intervention teams who were already champions for data-based decision making in academic instruction. In education, Conroy and Sutherland (2019) recently extended their evidence-based Best-in-Class intervention to adults working in child care settings, adapting its components in full partnership with community leaders. In a collaborative effort between faculty in the schools of medicine and education at the University of Washington (the SMART Center), faculty have created flexible, evidence-based emotional and behavioral health treatment, along with assessment, progress monitoring, and data-based decision-making tools for Seattle public schools (Bruns et al., 2016). We argue that heightening the focus on effective leadership and teamwork in the TBCCM will only enhance the uptake and sustainability of these and other multi-informant assessment and evidence-based interventions.

Directions for Future Research

In this section, we outline directions for future research in each of the components of the TBCCM: leadership and teamwork, multi-informant assessment, and implementation science.

Leadership and Teamwork

We have identified two key areas for future research in leadership and teamwork. The first area concerns the effectiveness of teams, particularly in low-income settings, given the tremendous heterogeneity in their composition and leadership. Although they do not typically serve as members of education or primary health care teams, promising research reveals that community health workers can serve as effective advocates and liaisons for children and families with the school and the primary care physician's office (Mehta et al., 2019; Power et al., 2014). Embedding these paraprofessionals within the school and/or health care team to provide case management and behavioral support for parents and children is likely to enhance youth positive behavior and academic engagement, particularly in low-income communities (Mehta et al., 2019). Developing relationships with community health care workers employed in federally funded health centers serving families in low-income communities is an area of further research for the TBCCM. The second area of research concerns how these teams, embedded within their communities and systems, engage in the

work of selecting and implementing evidence-based assessment and intervention practices—consistently viewing data that have been shared by parents and teachers to make intervention decisions. Furthermore, how do teams make sense of data obtained from different informants, particularly when those informants disagree in their ratings? What additional data might teams collect, using a data-based individualization approach (National Center on Intensive Intervention, 2020) to illuminate the behavior in context, particularly when informants disagree, and then use that additional information to improve the effectiveness of interventions?

For example, the quality of interventions delivered at Tiers 2 and 3 (i.e., both small group and intensive, individual interventions) is likely to be closely aligned with the effectiveness of the MTSS intervention teams and their skills in employing the process of data-based individualization (National Center on Intensive Intervention, 2020). We have seen that the successful engagement of parents with teachers can be enhanced when parents are fully engaged with the child's health care team (Michel et al., 2018). Yet the flexible leadership employed by both education and health care teams, the effective practices in which they engage, and the extent to which they use data to coordinate care and collaborate with one another has not been comprehensively addressed. To address these gaps, we propose both a qualitative study of demographically diverse education and health care teams to identify key ingredients of effective teamwork in the TBCCM, and a quantitative study of a representative sample of team members from the two systems to develop next steps in improving the quality of teamwork on behalf of youth with ADHD.

Multi-Informant Assessment

We see two important directions for research on use of multi-informant assessments within the TBCCM. First and as mentioned previously, a core component of the model lies in ascribing value to the unique perspectives of informants who commonly provide reports within ADHD assessments, such as parents and teachers. In particular, each of these informants tends to harbor particular expertise in observing the youth undergoing assessment within unique contexts, such as home and school. In these respects, to what degree do assessments currently conducted within team-based models of care actually incorporate data from multiple informants when making decisions surrounding care for ADHD? Alternatively, how often do assessors base ADHD-related care decisions on information from one information source? Stated another way, to the degree that an informed decision surrounding ADHD must involve determining the presence of symptoms as they manifest across multiple contexts, how often do assessors base their decisions using information sources that traverse multiple

contexts? The answers to these questions may reveal information on challenges to implementing the TBCCM in school settings.

Second, we noted previously that multi-informant assessments may reveal important information about the contexts in which youth experience mental health concerns. A great deal of work supports this notion, based on research conducted on a host of mental health domains such as disruptive behavior, social anxiety, depression, and autism (for reviews, see De Los Reyes, Cook, et al., 2019; De Los Reyes, Lerner, et al., 2019). Yet, we know little of the links between discrepancies observed in multi-informant assessments of ADHD and variations in behavior across contexts. This is surprising given the fact that context factors prominently in diagnostic definitions of the condition (APA, 2013). That being said, conceptual and measurement models exist to facilitate research on these issues as they relate to ADHD assessments (De Los Reyes et al., 2013; Makol et al., in press). In fact, the likelihood is quite high that existing data archives harbor the data necessary for this research, namely large samples that include parent and teacher ADHD reports, and independent assessments of behavior across home (e.g., observations of parent-child interactions) and school contexts (e.g., observations of classroom behavior; for a review, see De Los Reyes et al., 2015). Thus, we encourage the development of research networks that have collected parallel data across informant and behavioral measures, to achieve the sample sizes often needed to test questions surrounding links between informant discrepancies and cross-contextual variations in behavior (e.g., ≥ 300 participants; see (De Los Reyes et al., 2009; Lerner et al., 2017; Makol et al., 2019).

Implementation Science

Similarly, we have identified two key areas for research in the adaptation of implementation science methods within education and health care. The first is the need to study processes for the uptake of evidence in demographically diverse communities. Previously, researchers in low-income urban communities had sought to deliver evidence-based interventions to practitioners by employing teacher key opinion leaders to work with community mental health providers; together, these professionals sought to diffuse and disseminate evidence-based interventions in the schools for youth with ADHD (Atkins et al., 2008). However, researchers now recognize that these methods only go so far—that in order for interventions to be sustainable in real-world settings, researchers must engage leaders, practitioners, and families within these settings, ensuring that the work is embedded within communities and attentive to their culture (Alegría et al., 2010), even as interventions remain grounded in evidence (Lyon, 2016). Research with intervention teams

seems perfect for this process. Yet, in order for intervention teams to be successful in engaging families from low-income communities in research and intervention, family advocates may need to serve as team members.

For example, in a quasi-experimental design study of a collaborative care intervention in health care with urban families, Power and colleagues (2014) trained community partners to collaborate with school staff and identify community-based resources available to families of children with ADHD. Although they found no difference in child outcomes for members of their intervention and control groups, Power and colleagues (2014) noted that the intervention demonstrated promise compared with the control condition in improving families' perceptions about the helpfulness of services and reducing barriers to their children's care. Similarly, Mehta and colleagues (2019) found that school-family liaisons, who worked in community health centers and were embedded in schools, were effective in supporting parents in their children's schooling through consistent, informal contact. The discovery by this research team that informal contacts (as opposed to scheduled group meetings) were key to keeping parents engaged emerged through researchers' ongoing and careful review of multiple sources of data, including on-site observations, informal conversations with school-family liaisons, agency records, and monthly staff reports. The work of Mehta and colleagues (2019) illustrates the necessity and the value of employing implementation science methods that are participatory and engaging, both for team members and for families, especially in low-income communities. In future research, we propose to strengthen the participatory approach in the TBCCM in both education and health care and evaluate its effectiveness using multiple sources.

The second area of needed research in implementation science involves the adaptability of evidence-based practices, including those associated with the ADHD Care Assistant. Through application of the TBCCM, we can reconceptualize fidelity of implementation as a commitment to the fundamental elements of behavior change, even as we may be required to abandon our commitment to a particular program or intervention plan (Mehta et al., 2019). We can accomplish this by maintaining ongoing communication among team members in the two systems and a commitment to families' continued progress and children's success over time (see Mehta et al., 2019).

Concluding Comments

Collaborative care models in medicine have been successful in improving mental health outcomes for children and youth (see Kolko et al., 2012, 2014; Power et al., 2014; Yonek et al., 2020). The time is right to systematically extend these models through the TBCCM to education,

which represents, along with health care, one of two local, universal systems best positioned to deliver mental health services to youth with ADHD from a range of backgrounds and communities. The TBCCM advances this work by providing a team-based structure for the delivery of assessment and intervention, in both schools and health care settings, using implementation science methods and facilitating the active involvement of parents, teachers, and health care professionals who are embedded in their communities. Furthermore, the TBCCM emphasizes the ongoing use of multiple sources of data and the careful investigation of context for behavior when those data sources disagree. Integrating an assessment of context is an innovation in behavioral assessment and a key to improving services and outcomes for youth with ADHD. The TBCCM provides the perfect opportunity to embrace context in behavioral assessment and intervention in both education and health care.

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References

- Achenbach, T. M., McConaughy, S. H., & Howell, C. T. (1987). Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin, 101*, 213–232. <https://doi.org/10.1037/0033-2909.101.2.213>
- Alegria, M., Vallas, M., & Pumariega, A. (2010). Racial and ethnic disparities in pediatric mental health. *Child and Adolescent Psychiatric Clinics of North America, 19*, 759–774. <https://doi.org/10.1016/j.chc.2010.07.001>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Publishing.
- Atkins, M. S., Frazier, S. L., Leathers, S. J., Graczyk, P., Talbot, E., Jakobsons, L., Adil, J. A., Marinez-Lora, A., Demirtas, H., Gibbons, R. B., & Bell, C. C. (2008). Teacher key opinion leaders and mental health consultation in low-income urban schools. *Journal of Consulting and Clinical Psychology, 76*(5), 905–908. <https://doi.org/10.1037/a0013036>
- Bannister, S. L., Wickenheiser, H. M., & Keegan, D. A. (2014). Key elements of highly effective teams. *Pediatrics, 133*, 184–186. <https://doi.org/10.1542/peds.2013-3734>
- Barbaredi, W. J., Campbell, L., Diekroger, E. A., Froehlich, T. E., Liu, Y. H., O'Malley, E., Pelham, W. E., Power, T. J., Zinner, S. H., & Chan, E. (2020). Society for developmental and behavioral pediatrics clinical practice guideline for the assessment and treatment of children and adolescents with complex attention-deficit/hyperactivity disorder. *Journal of Developmental and Behavioral Pediatrics, 41*, S35–S57. <https://doi.org/10.1097/DBP.0000000000000770>
- Barrett, S., Eber, L., & Weist, M. (2013). *Advancing education effectiveness: Interconnecting school mental health and school-wide positive behavior support*. <https://www.pbis.org/resource/advancing-education-effectiveness-interconnecting-school-mental-health-and-school-wide-positive-behavior-support>
- Beidas, R. S., Stewart, R. E., Walsh, L., Lucas, S., Downey, M. M., Jackson, K., Fernandez, T., & Mandell, D. S. (2015). Free, brief, and validated: Standardized instruments for low-resource mental health settings. *Cognitive and Behavioral Practice, 22*, 5–19. <https://doi.org/10.1016/j.cbpra.2014.02.002>
- Bruns, E. J., Duong, M. T., Lyon, A. R., Pullman, M. D., Cook, C. R., Cheney, D., & McCauley, E. (2016). Fostering SMART partnerships to develop an effective continuum of behavioral health services and supports in schools. *American Journal of Orthopsychiatry, 86*, 156–170. <https://doi.org/10.1037/ort0000083>
- Conroy, M., & Sutherland, K. (2019). *Best in class*. <https://education.ufl.edu/best-in-class/about/implementation/>
- Danielson, M. L., Visser, S. N., Chronis-Tuscano, A., & DuPaul, G. J. (2018). A national description of treatment among United States children and adolescents with attention-deficit/hyperactivity disorder. *The Journal of Pediatrics, 192*, 240–246. <https://doi.org/10.1016/j.jpeds.2017.08.040>
- De Los Reyes, A., Augenstein, T. M., & Aldao, A. (2017). Assessment issues in child and adolescent psychotherapy. In J. R. Weisz & A. E. Kazdin (Eds.), *Evidence-based psychotherapies for children and adolescents* (3rd ed., pp. 537–554). Guilford Press.
- De Los Reyes, A., Augenstein, T. M., Wang, M., Thomas, S. A., Drabick, D. A. G., Burgers, D., & Rabinowitz, J. (2015). The validity of the multi-informant approach to assessing child and adolescent mental health. *Psychological Bulletin, 141*, 858–900. <https://doi.org/10.1037/a0038498>

- De Los Reyes, A., Cook, C. R., Gresham, F. M., Makol, B. A., & Wang, M. (2019). Informant discrepancies in assessments of psychosocial functioning in school-based services and research: Review and directions for future research. *Journal of School Psychology, 74*, 74–89. <https://doi.org/10.1016/j.jsp.2019.05.005>
- De Los Reyes, A., Henry, D. B., Tolan, P. H., & Wakschlag, L. S. (2009). Linking informant discrepancies to observed variations in young children's disruptive behavior. *Journal of Abnormal Child Psychology, 37*, 637–652. <https://doi.org/10.1007/s10802-009-9307-3>
- De Los Reyes, A., Lerner, M. D., Keeley, L. M., Weber, R., Drabick, D. A. G., Rabinowitz, J., & Goodman, K. L. (2019). Improving interpretability of subjective assessments about psychological phenomena: A review and cross-cultural meta-analysis. *Review of General Psychology, 23*, 293–319. <https://doi.org/10.1177/108926801983764>
- De Los Reyes, A., Thomas, S. A., Goodman, K. L., & Kundey, S. M. A. (2013). Principles underlying the use of multiple informants' reports. *Annual Review of Clinical Psychology, 9*, 123–149. <https://doi.org/10.1146/annurev-clinpsy-050212-185617>
- Dirks, M. A., De Los Reyes, A., Briggs-Gowan, M., Cella, D., & Wakschlag, L. S. (2012). Annual research review: Embracing not erasing contextual variability in children's behavior-theory and utility in the selection and use of methods and informants in developmental psychopathology. *Journal of Child Psychology and Psychiatry, 53*(5), 558–574. <https://doi.org/10.1111/j.1469-7610.2012.02537.x>
- DuPaul, G. P., Chronis-Tuscano, A., Danielson, M. L., & Visser, S. N. (2019). Predictors of receipt of school services in a national sample of youth with ADHD. *Journal of Attention Disorders, 23*, 1303–1319. <https://doi.org/10.1177/1087054718816169>
- Epstein, J. N., Langberg, J. M., Lichtenstein, P. K., Kolb, R., & Simon, J. O. (2013). The myADHDportal.Com improvement program: An innovative quality improvement intervention for improving the quality of ADHD care among community-based pediatricians. *Clinical Practice in Pediatric Psychology, 1*, 55–67. <http://dx.doi.org/10.1037/cpp0000004>
- Every Student Succeeds Act (2016). Title IX, Sec. 8002(33).
- Fabiano, G. A., & Pyle, K. (2019). Best practices in school mental health for attention-deficit/hyperactivity disorder: A framework for intervention. *School Mental Health, 11*, 72–91. <https://doi.org/10.1007/s12310-018-9267-2>
- Forman, S. G., & Crystal, C. D. (2015). Systems Consultation for Multitiered Systems of Supports (MTSS): Implementation issues. *Journal of Educational and Psychological Consultation, 25*, 276–285. <https://doi.org/10.1080/10474412.2014.963226>
- Freeman, R., Miller, D., & Newcomer, L. (2015). Integration of academic and behavioral MTSS at the district level using implementation science. *Learning Disabilities: A Contemporary Journal, 15*, 59–72.
- Guevara, J. P., Feudtner, C., Daniel Romer, D., Power, T., Eiraldi, R., Nihitjanova, S., Rosales, A., Ohene-Frempong, J., & Schwarz, D. F. (2005). Fragmented care for inner-city minority children with attention-deficit/hyperactivity disorder. *Pediatrics, 116*, 512–517. <https://doi.org/10.1542/peds.2005-0243>
- Hinshaw, S. P., & Arnold, L. E. (2015). ADHD, multimodal treatment, and longitudinal outcome: Evidence, paradox, and challenge. *Wiley Interdisciplinary Reviews: Cognitive Science, 6*, 39–52. <https://doi.org/10.1002/wcs.1324>
- Hunsley, J., & Mash, E. J. (2007). Evidence-based assessment. *Annual Review of Clinical Psychology, 3*, 29–51. <https://doi.org/10.1146/annurev.clinpsy.3.022806.091419>
- Kolko, D. J., Campo, J. V., Kilbourne, A. M., Hart, J., Sakolsky, D., & Wisniewski, S. (2014). Collaborative care outcomes for pediatric behavioral health problems: A cluster randomized trial. *Pediatrics, 133*, 981–992. <https://doi.org/10.1542/peds.2013-2516>
- Kolko, D. J., Campo, J. V., Kilbourne, A. M., & Kelleher, K. (2012). Doctor-office collaborative care for pediatric behavioral problems: A preliminary clinical trial. *Archives of Pediatric and Adolescent Medicine, 166*, 224–231. <https://doi.org/10.1001/archpediatrics.2011.201>
- Kolko, D. J., & Perrin, E. C. (2014). The integration of behavioral health interventions in children's health care: Services, science, and suggestions. *Journal of Clinical Child and Adolescent Psychology, 43*, 216–228. <https://doi.org/10.1080/15374416.2013.862804>
- Kraemer, H. C., Measelle, J. R., Ablow, J. C., Essex, M. J., Boyce, W. T., & Kupfer, D. J. (2003). A new approach to integrating data from multiple informants in psychiatric assessment and research: Mixing and matching contexts and perspectives. *American Journal of Psychiatry, 160*, 1566–1577. <https://doi.org/10.1176/appi.ajp.160.9.1566>
- Lerner, M. D., De Los Reyes, A., Drabick, D. A. G., Gerber, A. H., & Gadow, K. D. (2017). Informant discrepancy defines discrete, clinically useful autism spectrum disorder subgroups. *Journal of Child Psychology and Psychiatry, 58*, 829–839. <https://doi.org/10.1111/jcpp.12730>
- Lyon, A. R. (2016). *Implementation science and practice in the education sector*. Washington, DC: Substance Abuse and Mental Health Services Administration. <https://education.uw.edu/sites/default/files/Implementation%20Science%20Issue%20Brief%20072617.pdf>
- Lyon, A. R., Whitaker, K., French, W. P., Richardson, L. P., Wasse, J. K., & McCauley, E. (2016). Collaborative care in schools: Enhancing integration and impact in youth mental health. *Advances in School Mental Health Promotion, 9*, 148–168. <https://doi.org/10.1080/1754730X.2016.1215928>
- Makol, B. A., De Los Reyes, A., Ostrander, R., & Reynolds, E. K. (2019). Parent-youth divergence (and convergence) in reports of youth internalizing problems in psychiatric inpatient care. *Journal of Abnormal Child Psychology, 47*, 1677–1689. <https://doi.org/10.1007/s10802-019-00540-7>
- Makol, B. A., Youngstrom, E. A., Racz, S. J., Qasmieh, N., Glenn, L. E., & De Los Reyes, A. (in press). Integrating multiple informants' reports: How conceptual and measurement models may address long-standing problems in clinical decision-making. *Clinical Psychological Science*.
- Marsh, J. K., Zeveney, A., & De Los Reyes, A. (2020). Informant discrepancies in judgments about change during mental health treatments. *Clinical Psychological Science, 8*, 318–332. <https://doi.org/10.1177/21677026198949>
- Mehta, T. G., Lakind, D., Rusch, D., Walden, A. L., Cua, G., & Atkins, M. S. (2019). Collaboration with urban community stakeholders: Refining paraprofessional-led services to

- promote positive parenting. *American Journal of Community Psychology*, 63, 444–458. <https://doi.org/10.1002/ajcp.12316>
- Michel, J. J., Mayne, S., Grundmeier, R. W., Guevara, J. P., Blum, N. J., Power, T. J., Coffin, E., Miller, J. M., & Fiks, A. G. (2018). Sharing of ADHD information between parents and teachers using an EHR-linked application. *Applied Clinical Informatics*, 9, 892–904. <https://doi.org/10.1055/s-0038-1676087>
- National Center on Intensive Intervention. (2020). *Faculty professional learning series*. <https://intensiveintervention.org>
- National Health Interview Survey. (2018). <https://www.cdc.gov/nbdbdd/adhd/timeline.html>
- Pelham, W. E., Jr., Fabiano, G. A., & Massetti, G. M. (2005). Evidence-based assessment of attention deficit hyperactivity disorder in children and adolescents. *Journal of Clinical Child and Adolescent Psychology*, 34, 449–476. https://doi.org/10.1207/s15374424jccp3403_5
- Powell, B. J., Waltz, T. J., Chinman, M. J., Damschroder, L. J., Smith, J. L., Matthieu, M. M., Proctor, E. K., & Kirchner, J. E. (2015). A refined compilation of implementation strategies: Results from the Expert Recommendations for Implementing Change (ERIC) project. *Implementation Science*, 10, Article 21. <https://doi.org/10.1186/s13012-015-0209-1>
- Power, T. J., Blum, N. J., Guevara, J. P., Jones, H. A., & Leslie, L. K. (2013). Coordinating mental health care across primary care and schools: ADHD as a case example. *Advances in School Mental Health Promotion*, 6, 68–80. <https://doi.org/10.1080/1754730X.2013.749089>
- Power, T. J., Mautone, J. A., Marshall, S. A., Jones, H. A., Cacia, J., Tresco, K., Cassano, M. C., Jawad, A. F., Guevara, J. P., & Blum, N. J. (2014). Feasibility and potential effectiveness of integrated services for children with ADHD in urban primary care practices. *Clinical Practice in Pediatric Psychology*, 2, 412–426. <http://dx.doi.org/10.1037/cpp0000056>
- Power, T. J., Michel, J., Mayne, S., Miller, J., Blum, N. J., Grundmeier, R. W., Guevara, J. P., & Fiks, A. G. (2016). Coordinating systems of care using health information technology: Development of the ADHD Care Assistant. *Advances in School Mental Health Promotion*, 9, 201–218. <https://doi.org/10.1080/1754730X.2016.1199283>
- Splett, J. W., Perales, K., Halliday-Boykins, C. A., Gilchrest, C. E., Gibson, N., & Weist, M. D. (2017). Best practices for teaming and collaboration in the interconnected systems framework. *Journal of Applied School Psychology*, 33, 347–368. <https://doi.org/10.1080/15377903.2017.1328625>
- Sugai, G., & Horner, R. H. (2009). Responsiveness-to-intervention and school-wide positive behavior supports: Integration of multi-tiered systems of support. *Exceptionality*, 17, 223–247.
- Sundell, K., Beelmann, A., Hasson, H., & Schwarz, U. V. (2016). Novel programs, international adoptions, or contextual adaptations? Meta-analytical results from German and Swedish intervention research. *Journal of Clinical Child & Adolescent Psychology*, 45, 784–796. <https://doi.org/10.1080/15374416.2015.1020540>
- Sutherland, K. S., Conroy, M. A., McLeod, B. D., Kunemund, R., & McKnight, K. (2019). Common practice elements for improving social, emotional, and behavioral outcomes of young elementary school students. *Journal of Emotional and Behavioral Disorders*, 27, 76–85. <https://doi.org/10.1177/1063426618784009>
- Talbot, E., Mayrowetz, D., Maggin, D. M., & Tozer, S. (2016). A distributed model of special education leadership for individualized education program teams. *Journal of Special Education Leadership*, 29, 23–31.
- Weist, M. D., Eber, L., Horner, R., Splett, J., Putnam, R., Barrett, S., Perales, K., Fairchild, A. J., & Hoover, S. (2018). Improving multitiered systems of support for students with internalizing emotional/behavioral problems. *Journal of Positive Behavior Interventions*, 20, 172–184. <https://doi.org/10.1177/1098300717753832832>
- Yonek, J., Lee, C.-M., Harrison, A., Mangurian, C., & Tolou-Shams, M. (2020). Key components of effective pediatric integrated mental health care models: A systematic review. *Journal of the American Medical Association Pediatrics*. Advance online publication. <https://doi.org/10.1001/jamapediatrics.2020.1001>