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Brain Injury Is Treatable

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The “Care” workgroup was charged with identifying and proposing actions for long-term management of children and youth with TBI. As detailed in this article, the group concluded that the current system of care does not facilitate effective or efficient intervention for children with TBI.

Brain injury is treatable and we can optimize treatment gains by improving:

1. understanding of TBI effects,
2. awareness of evidence-based treatment approaches,
3. professional training, and
4. care coordination. Families, schools, and healthcare systems are integral to that treatment.

Children with traumatic brain injury (TBI) are under-identified and under-served by healthcare and educational professionals. Factors such as lack of understanding regarding long-term needs following TBI, limited awareness and training in emerging evidence-based practices and inefficient care coordination (Haarbauer-Krupa et al., 2017) impede effective clinical management. Despite these considerable challenges, childhood brain injury is treatable. Families, schools, and healthcare systems are integral to that treatment. Where a child lives and learns can also greatly influence long-term outcomes. Children from home environments with supportive caregivers have more positive outcomes (Wade et al., 2016). Closer proximity to medical care and providers who streamline postacute care, rehabilitation, and community services also positively affect recovery (Buzza et al., 2011). Schools with educators who are trained to understand the unique needs of students with TBI are better situated to ensure that needed services and accommodations are received upon a child’s return to school (Davies, 2016).

Evidence-based Treatment

The past two decades have seen a burgeoning of higher quality clinical trials (Wade et al., 2017), with mounting evidence for the utility of online family-centered problem-solving treatment (OFPST) and parent skills training in remediating behavioral challenges in older children/adolescents (Wade et al., 2019) and younger children respectively (Wade et al., 2017). OFPST is a cognitive-behavioral treatment that equips families with strategies for collaboratively managing TBI-related challenges while simultaneously providing the injured adolescent with strategies for addressing self-regulation and executive function deficits. Parent skills training promotes warm, responsive interactions with the child and predictable and consistent follow through while addressing the need to anticipate challenges and set the child up for success. Although a number of studies have also examined attention training programs and cognitive retraining, the findings are less robust and confounded by small and heterogeneous samples and failure, in some cases, to generalize beyond the skills directly targeted by the training (Dvorak et al., 2018).

Given the dearth of empirical evidence specific to addressing TBI-related challenges in the school setting, and promoting positive educational outcomes for these children, best practice recommendations have been informed by evidence-based practices validated in other populations with similar functional challenges. For example, students with ADHD or TBI may exhibit the same executive function challenges such as difficulty organizing and remembering to turn in their homework. Both groups may benefit from similar strategies to address this challenge (e.g., homework checklist). Recent white papers have emphasized the importance of utilizing well-validated instructional approaches with students with TBI (Dettmer et al., 2014). These include: using established instructional routines and providing systematic corrective feedback when teaching new skills or information.

Noncognitive approaches such as encouraging a growth mindset, reducing working memory load, engaging deep processing activities and practicing frequent recall have been shown to have strong effect on student achievement and also show promise for students with TBI.

Professional Training

Many healthcare providers are not trained in childhood TBI identification or treatment and educators are likewise unprepared to work effectively with this population (Glang et al., 2017). Thus, there is a critical need to improve professional training (Centers for Disease Control and Prevention, 2018). Healthcare professionals need formalized training on TBI diagnosis and management. Educators also need enhanced training in TBI recognition and response. Improved training can promote TBI identification and ensure consistent care across state lines, school districts, and age groups. As illustrated in the sidebar, training should be cost-effective and easily accessible to maximize reach. Professional development opportunities focused on improving medical providers' understanding of the type of services and the manner in which they are provided to students in schools would help to ensure that medical professionals are making appropriate recommendations. Additionally, improved systems of communication could promote interactions among medical professionals, school personnel, and families.

Teachers need to be trained to apply their existing knowledge and skills regarding management of academic, cognitive, and behavioral issues to students with TBI. Most educators are well-versed in the response-to-intervention (RtI) or multi-tiered systems of support frameworks (MTSS) and these frameworks can be applied to monitor progress and support transition during recovery following mild to severe TBI (see TABLE 1). Most schools also provide health services through a school nurse or, in some cases, a school-based health clinic, which can offer an effective means of providing TBI follow-up care in communities with few services. Transition coordinators who facilitates the transition of students with disabilities from high school to post-secondary work or college settings can also be better trained regarding the needs of students with TBI. This is especially true for students who did not require special education services in a K-12 setting but who might experience TBI-related challenges in college or in their chosen professions.

Coordinated Care

Care coordination involves the "deliberate organization of patient care activities between two or more" service providers who are working to deliver high quality care by meeting a patient's needs and preferences (Agency for Healthcare Research and Quality [AHRQ], 2014). Coordinated care helps to prevent or address obstacles to long-term goal achievement. It includes activities such as interdisciplinary communication or information sharing, coordination of patient care activities, and integration of services across institutions. The idea of a patient-centered medical home, or a coordinated, comprehensive means of providing care, is one such model of care coordination (Stange et al., 2010). There is a growing body of evidence to support the benefits of such coordinated care (Arend et al., 2012) for children and adults with other long-term health challenges.

Currently, there is no established model of care coordination for children who sustain a TBI, contributing to the risk for poor long-term outcomes (Dodd et al., 2019). The lack of coordinated care is particularly problematic because families are often unprepared to manage the challenges involved in their child's recovery and lack a clear picture of the difficulties that can arise at home, in school, and in the community. Unlike developmental disabilities, TBI is an unexpected trauma that acutely disrupts the entire family, affecting parental employment, income, and family dynamics. Caregivers need to figure out insurance coverage, litigation, and disability services, while managing possible feelings of grief, guilt, and fear. Moreover, families may not recognize potential long-term consequences and may fail to link current concerns with an earlier TBI. Care coordination and access to knowledgeable professionals can help families to recognize emerging needs and access appropriate services, particularly during times of transition (e.g., preschool to elementary school, high school to post-secondary school or work).

TABLE 1

Ascending Levels of Academic Support

Adapted from McAvoy, K., Eagan-Johnson, B., & Halstead, M. (2018). Return to learn: Transitioning to school and through ascending levels of academic support for students following a concussion. Neurorehabilitation, 42, 325-330. https://doi.org/10.3233/nre-172381

Tier	Focus of Tier Level
Tier 1	***Universal Level:***
	• Students receive informal assistance within the general education setting • Students receive quick and early screening • Students receive *academic adjustments* promptly and liberally • Students receive academic supports that can be adjusted frequently (hourly, daily, weekly) by the general education teacher • An Individualized Healthcare Plan (IHP) is a tailor-made plan for students whose healthcare needs affect or have the potential to affect the student's safe and optimal school attendance and academic performance
Universal Level Applied to Students Post-Concussion:	
	• Seventy % of students with a concussion recover within 4 weeks, therefore, the Return to Learn plan needs to be immediate and applied in general education • General education teachers need to be widely trained and empowered to front-load academic supports within the initial 4 weeks and fade academic supports as the concussion symptoms subside • An IHP may prove to be an ideal mechanism for use in the Return to Learn (either at a Tier 1 or Tier 2) process for students who have sustained a concussion

A culturally-competent care coordinator, who follows a child with TBI from injury into adulthood, provides a means for improving care coordination. The care coordinator identifies child and family strengths, provides information and resources, helps the family obtain appropriate services, assists in developing appropriate educational goals, and coordinates services by interacting with other professionals and systems. The care coordinator can also interface with local and state agencies to help obtain benefits such as Medicaid, private insurance, supplemental security income, Children's Health Insurance Program, community or charitable organizations. The efficacy and cost effectiveness of offering care coordinators has not been evaluated and care coordinators are not routinely available or funded, making this an important area for further research.

Care coordination can also be integrated into existing resources. For example, Parent Training and Information centers (PTIs) exist in every state, although locating them can be confusing because they have different names in different states. The Center for Parent Information and Resources website has a state-by-state listing of PTIs (https://www.parentcenterhub.org/find-your-center). Educators and clinicians, such as school psychologists and social workers, are trained in family support and collaboration and can also provide targeted parent support and coordination during meetings to discuss student-oriented goals. Implementing programmatic care coordination practices in the absence of law, policy, or clear guidelines is challenging. Thus, a critical area for improvement in childhood TBI management is to develop, assess, and disseminate best practice guidelines for coordination of care.

At next year's Galveston meeting, the Care workgroup will work to create a roadmap for an evidence-based coordinated system of care, implemented by well-trained professionals. The approach that we are hoping to implement across the United States is highlighted by the following case which illustrates effective management of individualized needs that may often go unrecognized and untreated in the absence of trained professionals and care coordination.

Case Example

Maria is a twelve-year-old sixth grade Hispanic female who sustained a severe TBI in a car crash. Maria's older brother was driving at the time of the crash. Maria proficiently speaks English as a second language, but her parents speak mostly Spanish. Before her injury, Maria was a high-achieving student who was involved in sports and extracurricular activities. During Maria's inpatient rehabilitation admission, her medical and school teams met with the family to help prepare for her transition back to her home, school, and community. This preparation included: meeting with Maria's classmates before she returned to school, securing a translator for parent meetings, locating resources to support Maria's brother as he copes with feelings of guilt for Maria's injury, working with the school to identify alternate transportation and necessary changes to her class schedule and academic needs (e.g., extra time for tests, notetaker in class), coordinating speech therapy between the school and community provider, and helping Maria's soccer coach figure out a role she can have on the team since she will be unable to return to active play this school year. Additionally, educators at Maria's school sought training in TBI so that they could employ the most effective instructional methods for Maria. This training also prepared school professionals to create a system to track Maria over time as she transitions from middle school to high school. Maria's family participated in an online family problem solving course to help improve communication and problem solving as they worked together to address the behavioral changes that were present after Maria's injury.

The emerging evidence suggests that the behavioral challenges and executive dysfunction arising from TBI are treatable even longer-term post injury. Through improvements in these 3 areas, we can increase identification rates, which will lead to children receiving more appropriate services and achieving better long-term academic, social, and vocational outcomes. This, in turn, will ultimately help children with TBI become healthy and productive adults.

Members of the Care workgroup include: Ruth Brannon, Lori Cook, John Corrigan, Susan Davies, Molly Fuentes, Chris Giza, Flora Hammond, Tessa Hart, Martha Hodgsmith, Geoff Lauer, Jennifer Lundine, Katherine O'Brien, Monique Pappadis, Deanne Unruh, Roger Wolcott

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Author Bios

Susan Davies, EdD, is a professor of school psychology in the Department of Counselor Education and Human Services at the University of Dayton. She is the school psychology program director and internship coordinator. Dr. Davies has 20 years of experience in the field of school psychology as a practicing psychologist, program evaluator, and university faculty member. Her research addresses traumatic brain injuries in school populations, including increasing educator awareness of TBI, efficacy of interventions, and model service plans for students with TBI.

Jennifer Lundine, PhD, is an assistant professor in the Department of Speech and Hearing Science at The Ohio State University. She is also a research scientist at Nationwide Children's Hospital, where she worked as a clinician on the pediatric rehabilitation unit for 12 years. Her clinical, teaching, and research interests include improving gaps in access to and utilization of services designed to support children with brain injury and identifying specific approaches that would improve assessment and treatment practices following pediatric brain injury.

Ann Glang, PhD, is a special education researcher who for over 25 years has designed and studied interventions to support children and adolescents with TBI, educators, and families. Dr. Glang has served as a principal investigator for numerous National Institutes of Health and Department of Education-funded projects in her role as a researcher and Director of the Center on Brain Injury Research and Training at University of Oregon. Her research interests include childhood brain injury prevention and interventions for helping teachers and families support children and adolescents with brain injuries.

Shari L. Wade, PhD, is a pediatric rehabilitation psychologist and Director of Research in the Division of Pediatric Rehabilitation Medicine at Cincinnati Children's Hospital Medical Center. She is also a tenured professor in the Department of Pediatrics at the University of Cincinnati College of Medicine. Dr. Wade has conducted federally-funded research examining outcomes of pediatric TBI and factors that influence outcomes since 1991. This widely-cited research has shaped how the field understands the role of social environmental factors on recovery following TBI and the effects of TBI on child and family functioning over time. For the past 20 years, she has conducted single site and multicenter randomized clinical trials of interventions to reduce morbidity following pediatric traumatic brain injury, including some of the first Class 1 clinical trials for pediatric TBI.

Support in the Classroom After TBI: An Evidence-based Training Approach for Educators

Ann Glang, PhD

Because educators lack accurate information about TBI, they often fill their knowledge gaps with their own personal experiences, which can lead teachers to misattribute students' behavior and academic challenges to their age, personality, or life circumstances rather than to an injury (Kahn et al., 2018). For example, behavior problems in students with TBI are often misdiagnosed as a premorbid problem or a learned inappropriate behavior rather than being appropriately linked to the TBI. Thus, there is a high-need for effective, feasible, teacher-training programs.

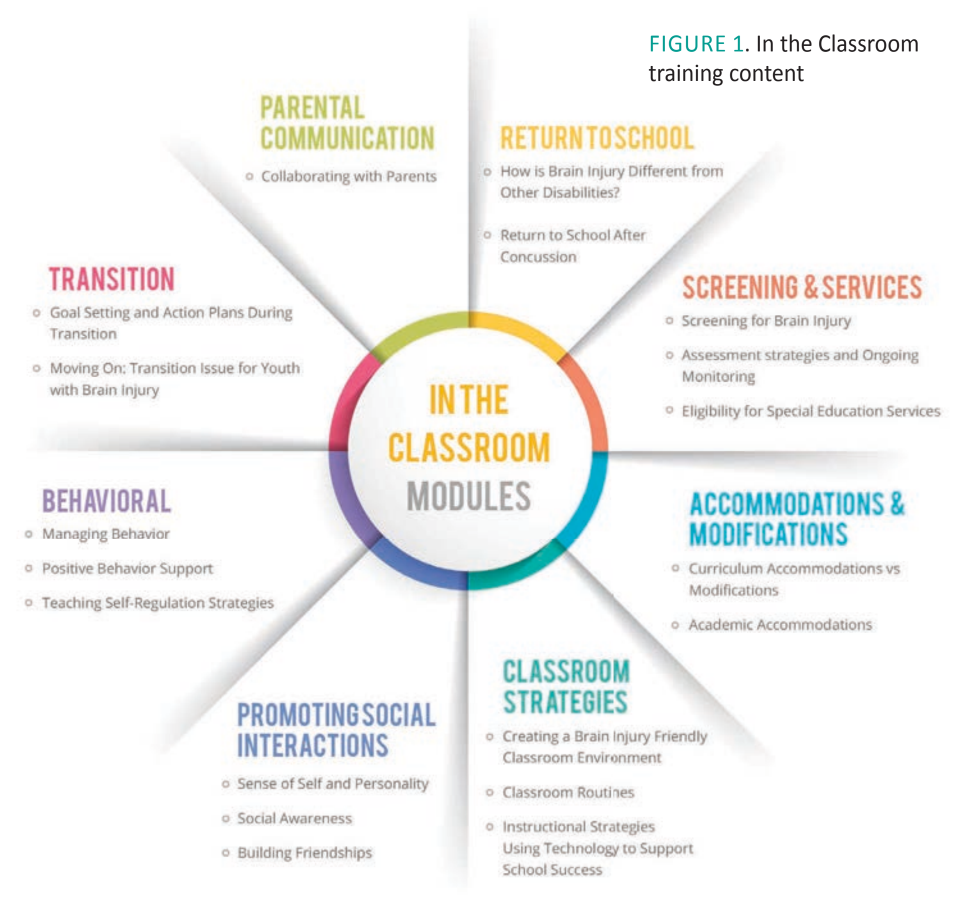

FIGURE 1. In the Classroom training content

The In the Classroom training was developed with funding from the National Institute on Disability, Independent Living and Rehabilitation Research (NIDILRR), and offers specific strategies for managing TBI-related cognitive, behavioral, and social problems in school (https://learn.cbirt.org/1/course/view.php?id=13/). The program was developed in partnership with the Center on Brain Injury Research and Training's Advisory Board, which includes educators from across the country, youth with TBI, family members, and state Department of Education partners. Because of the lack of research specific to students with TBI, the training content is drawn from research with children with other disability labels and similar learning challenges. FIGURE 1 depicts the In the Classroom training content.

The program uses interactive multimedia, an empirically validated design that provides tailored video-based training, and evidence-based instructional design principles. Content can be adapted to the role or position the person has in the school; for example, instructional assistants might view different modules than a school psychologist or speech-language therapist, thereby increasing the efficiency and efficacy of the program. Other validated instructional design components include: (a) application exercises with assessment and remediation loops to ensure comprehension, (b) interactive segments involving real-life scenarios that test user comprehension, and (c) sufficient practice and review to ensure content mastery.

Results from a randomized controlled trial with 100 educators showed that In the Classroom produced gains in educator skills, knowledge, and self-efficacy in using evidence-based instructional strategies with students with TBI (Glang et al., 2019).

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