Educational Issues and School Reentry for Students With Traumatic Brain Injury

Ann Glang, Debbie Ettel, Janet Siantz Tyler, Bonnie Todis

AQ1

INTRODUCTION

Each year, approximately 40% of traumatic brain injuries (TBIs) in the United States occur in the pediatric population (ages 0–19 years) (1). The Centers for Disease Control (CDC) estimates that more than 60,000 children and adolescents are hospitalized annually in the United States after sustaining moderate-to-severe brain injuries from motor vehicle crashes, falls, sports, and physical abuse; an additional 631,146 children are seen in hospital emergency departments and released (1). In all, nearly 145,000 children aged 0–19 years are currently living with long-lasting, significant alterations in social, behavioral, physical, and cognitive functioning following a TBI (2).

Reduced federal funding and managed care have resulted in shorter inpatient rehabilitation stays for patients, fewer services dedicated to families, and lack of access to ongoing rehabilitative services (3,4). Increasingly, children with mild-to-moderate TBI are released from treatment with no plans for long-term rehabilitation support. The result is that children who may have intense physical and/or cognitive needs return home to families who are largely responsible for supporting them through the rehabilitation process with little or no support from medical or community-based agencies (5,6). As a function of shortened hospital stays and the chronic problems arising from pediatric TBI, the primary service provider for children and adolescents has become the school. This chapter will describe the challenges students with TBI present to schools and strategies schools can use to address them.

OVERVIEW OF IMPACT OF TRAUMATIC BRAIN INJURY ON SCHOOL PERFORMANCE

Predicting the impact of a pediatric TBI on school performance is difficult, in part because no 2 injuries are alike, and also because the same etiological factor can cause diverse outcomes depending on the child and the context. Researchers (7) suggest that several variables influence student outcomes, including (*a*) the child's age at injury (8), (*b*) the severity of the TBI (9), (*c*) premorbid behavioral and learning status (10,11), (*d*) history of previous injury (12–15), and (e) postinjury pain or stress (16,17).

Academic Achievement, Executive Dysfunction, and Social Behavior Problems

Although the impact of pediatric TBI on a child's school performance is unique and dynamic, some general characteristics typify the course of impact and recovery (7). The most reported TBI sequelae related to school performance are (*a*) a progressive lag in academic achievement (18–21), (b) executive dysfunction, and (*c*) social and behavioral problems (22–24).

Academic Achievement

Most children make academic gains postinjury, but for students with moderate to severe injury, the rate of academic achievement gains tends to slow progressively over time, and the effects are long-term (18,25,26). Researchers (27) found that children with moderate TBI showed impaired academic skills both postacutely and chronically, whereas those with severe TBI showed greater impairment with only partial recovery in certain areas over time. One critical factor in children's lag in academic achievement was cognitive deficit as a result of brain injury.

In young children with TBI, recovery of cognitive skills across time may show no improvement (28) or may actually decline (29), demonstrating a failure to develop age-appropriate cognitive skills at typical rates. These cognitive deficits can be parsed into components of executive dysfunction, memory problems, diminished attention and impulse control, and information processing problems, all areas critical to learning and school success (30–32). Notably, some effects are immediate, and some sequelae may not become apparent until the child returns to the school environment or much later, when the demands for competence in reasoning, executive functioning, self-regulation, and social skills increase (33,34). Because TBI cognitive sequelae are diverse and dynamic, educator awareness is critical to providing students with appropriate monitoring and support as needs and issues change, sometimes dramatically, over time.

Executive Dysfunction

Disruptions in executive function (EF), characterized by skills in attentional control, planning, goal setting, problem

solving, cognitive flexibility, and abstract reasoning, can occur as a result of direct damage to frontal regions or from disruption of connections among these and other brain regions. Because EF orchestrates so many domains of cognition, emotion, and behavior, the functional results of executive dysfunction are multidimensional and debilitating (35–37).

At the root of many of the academic, social emotional, and behavioral issues that can follow a TBI are problems with self-regulation, the internal control functions that direct and organize all nonreflexive or nonautomatic behavior, including social, cognitive, and linguistic behavior (38). The same regulatory deficits that underlie learning problems (e.g., trouble focusing on classroom work, irritability, and impulsiveness) can also negatively affect social-emotional behavior and interpersonal relationships with peers and adults (39–42). For example, self-regulation skills required in a school setting include keeping hands and feet to oneself, taking turns in a conversation, and maintaining an emotional state appropriate to the school context. Neural systems that regulate these behaviors might be compromised, making both appropriate academic behavior and interpersonal behavior challenging for students.

In a school setting, deficits in EF can manifest as impulsiveness, poor social judgment, disorganization, social disinhibition, weakly regulated attention, slowed processing, ineffective planning, and reduced initiation (31,33). Because of difficulty with organization and attention, educators might observe students having problems managing their assignments, gathering materials, starting on tasks, or staying on task. In addition, some students struggle with transitions from one class to the next, and they might have difficulty sequencing multistep procedures or recalling assignments. Thus, executive dysfunction in the classroom presents myriad challenges for students with TBI.

After TBI, students may perform poorly on tasks of sustained, selective, and shifting attention (43). A student may have difficulty concentrating for extended periods, performing 2 tasks simultaneously (such as listening while taking notes), or completing 1 task and switching attention to a new task. Lack of attentional flexibility can also result in diminished problem solving skills. For example, a student who loses a pencil might not be able to generate problem-solving ideas for replacing it. Both initiation skills and attentional flexibility are needed to keep the lack of a pencil from being an insurmountable barrier to work completion. For children with mild injury, inattention and behavior challenges were the most frequently reported problems (44).

The speed with which students process information may change dramatically after a TBI (43). Students may take longer to respond to teacher questions or instructions, or they may need longer to complete tasks or process teacher directions. This greater response latency can be misinterpreted as refusal to respond or begin work. Students should be allowed adequate time to process and comprehend assignments (45). Language production and processing can also be impaired, resulting in problems in word finding, language fluency, receptive language comprehension, reading comprehension, and writing skills.

TBI often results in memory problems (sensory, working, and/or long-term memory; retrograde and anterior grade amnesia) that can negatively affect the assimilation of new material or skills (46–48). It has been found (49) that among young children, skills emerging at the time of brain injury were more vulnerable to disruption than skills already learned. Previously learned skills might be intact or compromised, and difficulties with working memory can negatively affect the child's ability to learn new material. Educators might notice uneven academic performance, with some lower level skills missing while more sophisticated skills remain intact, making appropriate instruction more challenging.

Social Behavioral Problems

Social dysfunction might be the most debilitating of all the TBI sequelae, affecting not only functional aspects of daily living but also quality of life (50). Unfortunately, much of the research focus has been on the effect of TBI on physical and cognitive domains, and social-emotional skills have not received as much attention. Children with an early brain injury (especially before 2 years of age) are at risk of significant social impairment (50). Social and emotional problems can become increasingly apparent during the transition from childhood to adolescence, when expectations for the use of appropriate social skills increase (51–53). Students with TBI might display disruptive behavior, emotional distress, poor conduct, and problems with empathy, moral reasoning, and peer relationships (35). Addressing potential social behavior deficits is just as critical to successful school functioning as addressing academic and cognitive skills—perhaps more so (54–56).

Sometimes overlooked is the emotional grief, sadness, or anger resulting from loss of preinjury abilities or identity. Even years after their injury, adults who sustained a childhood TBI report differences in self-concept postinjury, with the current self viewed more negatively than the preinjury self, and development of new identity as an ongoing process (57). Unfortunately, counseling or therapeutic support addressing post-traumatic stress or grief is often lacking for students with TBI. Grief and recovery from emotional trauma, especially when combined with poor impulse control, can lead to unpredictable emotional outbursts, irritability, labile affect, and depression. Educators might observe social withdrawal behaviors, poor adaptive behaviors, or apparent egocentrism as a result (58,59). The combination of these deficits can also result in problems with delinquency if not identified and addressed with appropriate intervention and support. High rates of incarceration among people with TBI have been noted (60).

A commonly noticed area of concern is lack of self-awareness, particularly of students' own skill deficits. For example, a student might express an emotional response inappropriate for a given situation (e.g., laughing when discussing a serious topic) and remain unaware of the inappropriateness of the action despite negative reactions from peers. These deficits in insight can cause misperceptions or distortions of social cues and interactions, affecting how the student relates to others or interprets their intentions and behaviors, resulting in confusion, misunderstanding, and conflict. Peers may be frustrated with the student if he or she misses important social cues, fails to regulate behaviors such as talking out of turn, or denies postinjury deficits and rejects support offered. Ironically, some research (58) has found awareness of the discrepancy between the preinjury

and current (postinjury) self negatively correlated with self-esteem and positively correlated with depression; that is, lack of self-awareness is associated with 1 set of problems, whereas increased awareness has its own array of psychological costs (61).

Other functional areas pertinent to school performance include perceptual skill deficits and physical impairment. Sensorimotor changes can occur, resulting in increased sensitivity to environmental stimuli such as hypersensitivity to light and sound or diminished ability to screen out background sounds. For example, students who once had no difficulty copying notes from a blackboard might find the task coordination difficult because of visual–motor changes (62,63). Classrooms are highly stimulating environments—visually, aurally, and kinesthetically—that can overtax the cognitive abilities of a student in recovery from a brain injury. A student with poor impulse control might react inappropriately to such stimuli.

Educators also need to be aware that students can experience extreme fatigue (64), especially early in the postacute recovery phase when ordinary tasks might require greater mental exertion by the student because of difficulty in processing, organizing, initiating, and maintaining academic engagement. The student's physical stamina might be compromised, requiring increased rest or shortened school days or class periods to address fatigue and support the recovery process. In addition to fatigue, the student might have sustained other physical injuries that can adversely affect school performance. Furthermore, anticonvulsant or other medications may be prescribed prophylactically to reduce the likelihood of seizures or address behavioral or attentional concerns. Educators should be made aware of the intended and unintended effects of any such prescriptions on student behavior, attention, mood, and learning (65).

Mediating and Moderating Factors

Several factors have been found to mediate and moderate the effects of TBI on school performance. The most commonly noted factors include (*a*) age at injury, (*b*) severity of injury, and (*c*) family environment.

Age at Injury

It was previously thought that the developing brain was more resilient to trauma because of neuroplasticity, the flexibility of the young brain to reorganize or reassign tasks from one functional area to another area (66,67). Newer evidence has shown that early injury is associated with poorer outcomes than later injury (29,49,68). As young children with TBI develop, behavioral and cognitive problems might continue to emerge (51,69).

Other specific outcomes associated with early injury include deficits in executive functioning, expressive language, attention, academic achievement, and social skills, and less recovery of cognitive skills compared with children injured later (18,29,68,70–73). Longitudinal studies have shown that early age at injury negatively impacts outcomes in likelihood of postsecondary education enrollment, employment, and independent living. Early age at injury and severe injury were associated with employment in primarily entry level or low-skilled jobs, fewer hours worked per week, and lower pay for both males and females (29,68).

Injury Severity

In young children with TBI, severity of injury also predicted postacute effects on cognitive and school readiness skills, including memory, spatial reasoning, and EF. More severe TBI predicted more negative outcomes (74–78). However, some studies found mixed results of the impact of injury severity on outcomes, with severity of injury becoming less predictive of outcomes 1 year postinjury (79). A severe injury at an early age has been associated with the poorest long-term outcomes, including cognitive skill recovery (24,68,80).

Family Environment

Particularly in relation to social and behavioral outcomes, family environmental characteristics—such as socioeconomic status (SES), overall family functioning, and parenting behavior—can significantly affect student educational performance (26,32,55,81–84). Premorbid child and family functioning have been linked to outcomes; children with prior psychiatric disorders and families already struggling are more likely to manifest negative postinjury psychosocial effects (80,85–90). Negative social outcomes from TBI are exacerbated by postinjury family environments that are lower SES, lacking resources, and have poorer family functioning (55). Other researchers (84) reported a ''double hazard'' effect in which family socioeconomic disadvantage combined with severe injury to lead to the poorest long-term outcomes. Although family variables can moderate psychosocial outcomes for children with TBI (especially behavioral adjustment and social competencies), this moderating influence can wane with time among children with severe TBI (74,91).

Specific parenting behaviors have also been associated with children's outcomes after TBI. It was found (74) that high levels of permissive or authoritarian parenting were associated with increased behavior problems in children with TBI, particularly for those with severe injury. Poorer outcomes associated with these parenting styles are in contrast to those from *authoritative* parenting, characterized by parental warmth, clear boundaries and expectations, consistent rule application, and active parental monitoring. Authoritative parenting was associated with better psychosocial outcomes (74). In general, strong family social support and cohesion was predictive of students' better adaptive functioning, social competence, and global functioning postinjury (26,82). Other family variables believed to interact with factors predicting recovery include family expectations, stress and functioning (32,92–94), and genetic vulnerability (95,96). These factors interact with each other to mediate effects, but all predictors also directly affect all outcomes (74).

OUTCOMES BY AGE-GROUP

Preschool-Aged Children

Young children (birth to age 5) who experience a TBI are at greater risk for deficits in expressive language, attention, and academic achievement than children who are injured at later ages (18,29,63,68,71,74,97). An early injury affects a developing brain that has not yet formed critical features necessary for mature function, potentially interrupting or hindering the developmental process. Some suggest that poorer outcomes in children injured early in life might be caused by

the developing brain's greater susceptibility to diffuse brain insult, resultant abnormalities in neurogenesis, or resultant difficulties in acquiring new skills postinjury (18,70,71,98,99). Some researchers (70) have stressed the link between early developmental level and TBI; those injured very young demonstrate persistent deficits in academic skills (reading, decoding, comprehension, spelling, and arithmetic). Difficulties in global cognitive function, adaptive behavior, EF, and nonverbal abilities have been observed as well (74,97). Others (74) have found that preschool-aged children with TBI had weaknesses in nonverbal abilities and EF and recommended the use of memory cues and direct instruction teaching methods—structured curricula, multiple presentations, and many opportunities for students to practice new skills.

Children injured when young might present no immediately observable deficits; however, such children should be monitored for the potential emergence of latent TBI sequelae that might appear as task and setting demands increase. For example, behavior difficulties after early injury may not be apparent until the child attends elementary school, when expectations for self-regulation, control of attention, and task complexity rise appreciably (100).

School-Aged Youth

Issues for school-aged youth with TBI (grades K–12) become heightened as the task and setting demands of school progressively increase. Some (88) have found that children who sustained moderate-to-severe TBI during their school years were likely to need special assistance in school at 1 year postinjury. Others (101) reported that reading skills are often compromised by TBI, and still others have found greater academic deficits in arithmetic, possibly because of arithmetic's necessary component skills in attention, memory, and executive functioning (102). Students are expected to become more independent learners, demonstrate self-regulatory skills (staying on task, completing work, keeping hands to self, answering when called on), and master increasingly complex skills and more abstract concepts. For the school-aged child with TBI, these can all present challenges in the school setting. In addition to the academic expectations, the child's social focus shifts from family to peers, where interpersonal social skills take on increasing importance and begin to include communication, negotiation, reciprocal interaction, and social participation (54,56,103). In summary, educators need to be aware that school-aged youth with TBI might be challenged by the increasing cognitive, academic, and behavioral demands in the school setting and by the increasing importance and complexity of their developing social relations with peers.

Post-High School Outcomes

A growing body of research indicates that for many students with TBI, post-high school outcomes are poor (68,104–106). The second National Longitudinal Transition Study (108) found that fewer than half of students with TBI who had been out of school a year or more had a paid job outside the home. Young adults (ages 18 years or older) with TBI who received special education were employed and enrolled in postsecondary education at lower rates than peers in the general population (107).

Furthermore, rates of engagement in employment and postsecondary training and education remain low throughout early adulthood. In a recent longitudinal study of post-high school outcomes (68), the highest rate of enrollment in postsecondary education was 34% at age 21. Enrollment decreased with being male, earlier age at injury, and lower SES (68). A key finding was that although few students injured before age 14 enrolled in postsecondary education, students who sustained a TBI during adolescence attempted to pursue their preinjury college plans, often with negative results. Unable to meet academic, social, and independent living demands, many PSO participants struggled for several years before leaving college without degrees. A few were able to set new goals, discover helpful strategies, and eventually complete 2- or 4-year degree programs (106). Participants in the same study also experienced challenges in the area of employment, working fewer hours for lower wages than their nondisabled peers. None of the student participants worked more than 30 hours per week, and wages averaged slightly above minimum wage. At age 25, most still worked at entry level or low-skilled jobs as their nondisabled peers were moving up to higher paid, skilled, and professional positions (108). Earlier age at injury and more severe injury were associated with fewer hours worked per week and lower pay (68). AQ2

In a qualitative study with the same PSO sample, receipt of postsecondary transition services (in which individuals were linked with support agencies and disability services) was associated with completion of postsecondary programs (106). Focus on the modifiable variables that affect postsecondary outcomes is important for improving the lives of students with TBI.

MODIFIABLE FACTORS IN TRAUMATIC BRAIN INJURY OUTCOMES

In addition to child- and family-centered factors, a range of other external or environmental variables affect outcomes among children with brain injury. Challenging as it can be to address these factors, they hold promise for improving outcomes for students with TBI because they can be modified through improved training and changes in policy and practice.

Lack of Educator Awareness

Effective educational practices implemented by trained educators can contribute to successful school outcomes for children and youth with TBI (106). However, many teachers receive little or no training in childhood TBI (119,110). In a recent survey of educators working with students with TBI, 92% reported having no training in the academic effects of TBI (111). Furthermore, a recent analysis of university textbooks revealed that TBI is rarely discussed in current special education texts and is virtually absent from the general education texts reviewed (112). The lack of information about TBI for educators leads to a continued lack of awareness about the school-related implications of TBI and absence of strategies for addressing them. This lack of awareness leads to a perception among school personnel that TBI is a ''low-incidence disability,'' which in turn contributes to the under-identification of children with TBI for special education.

Underidentification and Misidentification

The most recent special education census data suggest that there continues to be a significant discrepancy between the incidence of TBI and the identification of children with TBI for special education services (113). Approximately 145,000 children live with persistent disability following TBI (2). However, according to the most recent figures from the US Department of Education, the total number of students receiving special education services under the TBI category is 23,509 (114). This rate is likely an underestimate, given that 60,000 children are hospitalized each year for TBI (1). Rates of identification for special education are higher for students with severe TBI, problem behavior, poor academic performance, and socioeconomic disadvantage (88,115–118). Of particular concern, given the changing needs of children as they grow older and school demands increase, is that special education identification rarely occurs after the first year postinjury (118). Although it is likely that some children with TBI receive services under different disability labels (e.g., speech-language, physical disability, or ''other'') (118–120), it is unclear whether such services meet the cognitive and behavioral needs of students with TBI. Because most children with TBI rely on schools rather than medical settings for rehabilitation services, the underidentification and misidentification of children with TBI presents a significant obstacle to the provision of effective services.

Lack of Hospital–School Communication

There continues to be a weak link between the hospitals that treat children for TBI and the schools who educate them—in terms of both their respective understanding of one another's worlds and their mutual communication and coordination efforts (121,122). Between April 1994 and January 1999, the National Pediatric Trauma Registry tracked children ages 5–19 who were hospitalized with TBI in participating trauma centers and children's hospitals across the United States and who were discharged to their homes following treatment. Of this group, 13.2% had documented cognitive impairments resulting from their brain injury at the time of discharge, and 11.6% had behavioral impairments; yet less than 1% of these children were recommended by medical staff for referral to special education (121). A critical modifiable factor contributing to identification of students with TBI for formal services is communication and linkage between hospitals and schools. Although informing educators that a student has a TBI does not guarantee that appropriate services will follow, *not* being informed by hospital personnel or parents decreases the likelihood that educational services will be tailored to the student's specific needs (122).

Parent–Educator Relationships

A critical factor that influences school outcomes for children with TBI is the degree of collaboration between the child's parents and educators (123). When parents and educators have trouble working in partnership, conflicts arise, and the student's education suffers (124–126). Unfortunately, parent–professional relationships can easily become adversarial because of the many stressors both families and school staff face in designing educational programs for students with TBI. From the school's perspective, families often have unrealistic expectations and/or are unable to support the school's efforts (127). Parents, on the other hand, often retain preinjury expectations about academic achievement and perceive school staff as having low expectations that do not change, even as the child's school performance improves (127). Furthermore, because prior to the injury, most children with TBI progressed typically through school, parents are often unfamiliar with the provisions of the Individuals with Disabilities Education Act and their role and rights in the educational process.

EFFECTIVE EDUCATIONAL PRACTICES

Because of the physical, cognitive, academic, and psychosocial sequelae of TBI, students may require special education services, special assistance, or accommodations on returning to school, with many students continuing to require such services throughout their education. From the hospital-to-school transition to the post-high school transition to community-based services, training, and employment, the hub of the support system for students with TBI and their families is the school.

Coordinated Hospital-to-School Transition

One of the most critical points in a child's rehabilitation process is at the transition from hospital to school. It is at this point that the child can most easily gain access to formal services through communication between hospital and school staff (122). Recommendations regarding school reentry planning include having school personnel observe the student in the hospital, attend hospital predischarge meetings, and obtain information from the hospital before the child's school reentry (128–130). Although it may be difficult under managed care for hospital staff to fully participate in the transition process, the hospital–school communication link should begin early in the child's hospital stay, so that protocols are in place for hospital staff to alert school staff to those students with brain injuries, even those with mild injury (131,132). Referral is also needed for students who were already receiving special education services at the time of their injury (e.g., for a learning disability or a behavior disorder), as moderate-to-severe TBI can cause significant additional cognitive impairment in children with preexisting learning difficulties, and programming modifications are often needed after injury (133).

The Individuals with Disabilities Education Improvement Act of 2004 (IDEA) (134), provides guidelines for referral, evaluation, eligibility determination, parent involvement in decision-making, individual education plans, and delivery of specially designed instruction and related services.

Given the eligibility requirements of IDEA, and the current underidentification of students with TBI, TBI researchers and advocates are exploring ways to assure that all students with TBI who need special education services are able to access them. Recent research has demonstrated that in addition to severity of injury, the provision of hospital–school transition services is strongly related to being identified for formal services (either via individual education

plan [IEP] or 504 plan) (128). Although hospital-to-school transition support emerged in this study as a strong predictor of being identified for formal special education services, only half (50.9%) of students in this study received any form of transition information or guidance from the hospital. Stated briefly, informing educators that a student has TBI does not guarantee that appropriate services will follow, but *not* being informed by hospital personnel or parents decreases the likelihood that educational services will be tailored to a student's specific needs.

Two promising practices are currently being evaluated and could improve identification processes at the state level. The School Transition Re-entry Program (STEP) is a systematic notification system designed to increase effective transition from hospital to school (135). Essential elements of this model are (*a*) hospital staff obtain a release from parents and notify an identified contact at the state Department of Education (DOE) about the child, (*b*) DOE notifies a regional transition facilitator that a child who has been treated for TBI is returning to school in that region, and (*c*) the transition facilitator contacts the child's school and family to offer resources and support. Preliminary analyses suggest that among students who do not receive hospital rehabilitation services, students receiving STEP services—systematic transition from hospital to school—are identified significantly more often for special education than those who do not receive systematic transition. Furthermore, students in the STEP group received more services, and their parents reported significantly greater satisfaction with the school and found a greater number of school staff helpful compared with parents of students in the control group (135). Thus, the STEP intervention appears to provide the essential link from hospital to school previously available only to students receiving rehabilitation services.

A second promising approach systematically tracks and supports students with mild TBIs as they transition back to school athletic and academic activities. The Reduce, Educate, Accommodate and Pace (REAP) model is a systematic notification system to increase effective concussion management from emergency department to school (www.youthsportsmed.com). A person at the emergency department obtains a release from the family and provides the REAP manual of concussion management. That person then faxes the release and an information form to an identified contact at a centralized site. The centralized site contacts a point person at the child's school within 48 hours. The point person then coordinates concussion management within the school until the child recovers, tracking and monitoring for latent concerns. Concussion management may also include providing information on physical and academic accommodations and other ways educators can reduce the cognitive, emotional, and physical load on students recovering from mild TBI.

These are 2 models of systematic communication between hospitals and schools. Central to both models is the presence of school-based professionals trained in TBI who can ensure the student receives the support necessary to succeed in school.

Special Education Law

When the provision of special education in public schools became federal law in 1975 (136), guaranteeing all students a ''free and appropriate public education,'' no specific category for TBI was included. TBI was not introduced as a separate disability category until 1991 in IDEA. Before that time, students with TBI were identified for special education as ''other health impaired'' or under a specific learning disability. Some students received services under Section 504 of the Rehabilitation Act of 1973, and others were not served through either mechanism (122). Given the long-term effects of underidentifying students with TBI for special education services (137–139), accurate and appropriate assessment is critical to identify and address students' needs for educational support (119,140).

Referral Process

Parents, teachers, therapists, medical personnel, or others can begin the process of evaluating the child's educational needs by making a referral to the school's support services team or administrator. The team—made up of teachers, specialists, administrators, and others—is charged with evaluating the child's educational needs in all areas of suspected disability and determining whether the student meets eligibility criteria (as a child with a disability) to receive special education services. Each category of disability has specific eligibility criteria in the law.

Eligibility for Special Education Services

To determine whether a child is eligible for services, an evaluation based on the guidelines specific to the area of suspected disability must be conducted. The evaluation requirements for TBI are outlined in Table 37-1.

Issues in Assessment and Instruction of Students with Traumatic Brain Injury

Because of the diversity within the population of students with TBI, there is no *one* TBI assessment; each assessment must be tailored to the student's unique and changing needs. Several general principles and strategies, however, are recommended to guide educators (34,131,138,142,143). First, accurate interpretation of assessment results requires an understanding of the potential effects of TBI on students' learning and response patterns. For example, students' performance may be uneven across academic domains. They might show relatively strong performance on material mastered preinjury, although evidence of new learning could be lacking. Also, because content and skill gaps could be present throughout the range of skills, examiners might need to suspend typical basal and ceiling rules of standardized measures to more accurately capture student performance.

Second, the potential for both skill recovery and skill deterioration over time makes ongoing formative assessment and frequent monitoring especially important for students with TBI (144,145). Educators should rely on ecologically valid sources of information, such as parent and teacher behavior scales and interviews, curriculum-based assessment, and permanent product evaluation, and they should choose methods closely tied to instruction and intervention (138,146). In addition to being more relevant to instruction, these measures are more sensitive to small changes in student performance and could prove more beneficial to

TABLE 37-1 IDEA Criteria for Special Education Eligibility Under Traumatic Brain Injury (141)

	IDEA CRITERIA FOR ELIGIBILITY UNDER TRAUMATIC BRAIN INJURY
Definition of TBI	An acquired injury to the brain caused by an external physical force resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child's educational performance. The term applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem-solving; sensory, perceptual, and motor abilities; psychosocial behavior; physical functions; information processing; and speech. The term does not apply to brain injuries that are congenital or degenerative, or to brain injuries induced by birth trauma.
Evaluation must include	(a) A medical or health assessment statement indicating that an event may have resulted in a TBI. (b) A comprehensive psychological assessment, using a battery of instruments to identify deficits associated with TBI, administered by a licensed school psychologist or the state Board of Psychological Examiners or others having training and experience to administer and interpret tests in the battery. (c) Other assessments, ***as needed***, such as motor, communication, and psychosocial assessments (A) Other information related to the child's suspected disability, including preinjury performance and a current measure of adaptive ability. (B) Observation in the classroom and at least 1 other setting. (C) Other additional assessments needed to determine the effect of the suspected disability on the child's educational performance for his/her age group. (D) Other assessments needed to identify the child's educational needs.
Conditions must be met	(a) Must have an acquired brain injury caused by external physical force (b) Condition is permanent or expected to last for more than 60 calendar days (c) Injury results in an impairment in 1 or more areas: (A) Communication (B) Behavior (C) Cognition, memory, attention, abstract thinking, judgment, problem-solving, reasoning, and/or information processing (D) Sensory, perceptual, motor, and/or physical abilities
The evaluation must determine	(a) The child's disability has an adverse effect on the child's educational performance (b) The child needs special education services as a result of the disability
Definition of TBI excludes	Brain injuries that are congenital, degenerative, or induced by birth trauma

student progress than norm-based measures standardized on noninjured student populations.

Third, schools could consider bringing neuropsychological experts into the planning process by including independent neuropsychologists in the assessment of and planning for students. The neuropsychologist's expertise in the clinical and neuropsychological aspects of functioning after TBI combined with the school psychologists' familiarity with academic assessment, instruction, and contextual issues within the school setting makes for a comprehensive assessment team (146,147). Also, building the capacity of existing staff by offering further neuropsychological training for school psychologists and others and improving in-service for staff to include basic information on the cognitive, academic, and behavioral profiles of students with TBI can increase the capacity of the broader school community (rather than a few select individuals) to support these students' unique needs across contexts.

Fourth, contextual assessment is a good framework for assessing the student with TBI in the educational setting (138,148). Contextual assessment, also referred to as ecological assessment (149), stresses the importance of multisource, multidimensional assessment, gathering relevant information about the child's strengths and needs including (*a*) observations within the school setting; (*b*) parent interviews; (c) review of medical records; (*d*) file review of preinjury performance; (*e*) interviews with medical personnel, including rehabilitation teachers and home instruction staff; (*f*) behavior rating scales and checklists; (*g*) motor, sensory, and physical assessments as needed; (*h*) standardized and curriculum-based performance measures; and (*i*) adaptive behavior (146,147,150). Adaptive behaviors or activities of daily living are not routinely assessed in the school setting apart from evaluations for students with serious developmental delay. For students with TBI, the activities of daily living (e.g., independent skills in walking, talking, getting dressed, going to school, going to work, preparing a meal, cleaning the house, and adapting to the demands of one's environment) might be compromised by injury and need to be addressed.

Comprehensive Assessment

Within the student's school, home, and community, functional domains to be assessed include cognition, language, memory and concentration, sensory recognition and perception, academic achievement, behavior, and personality. In addition to input from parents and educators, a neuropsy-

TABLE 37-2 Tests Commonly Used with Students with Traumatic Brain Injury

DOMAIN	TEST
Cognition	• Cognitive Assessment System (152) • Comprehensive Test of Nonverbal Intelligence, 2nd ed. (153) • Differential Abilities Scale, 2nd ed. (154) • Kaufman Assessment Battery for Children, 2nd ed. (155) • Stanford-Binet Intelligence Scales, 5th ed. (156) • Wechsler Preschool and Primary Scale of Intelligence, 3rd ed. (157) • Wechsler Abbreviated Scale of Intelligence (WASI) (158) • Wechsler Intelligence Scale for Children, 4th ed. (159) • Woodcock Johnson, 3rd ed.; Tests of Cognitive Abilities (160)
Neurospsychological	• Children's Category Test (161) • Functional Independence Measure (FIM) (162) • ImPACT (Immediate Postconcussion Assessment and Cognitive Testing) (163) • NEPSY-II, 2nd ed. (164) • Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) (165)
Memory	Children's Memory Scale (166) Continuous Performance Test-II (167) Logical Memory I and II (168) Wechsler Memory Scale–IV (169) Wide Range Assessment of Memory and Learning 2 (WRMAL2) (170)
Executive function	Behavior Rating Inventory of Executive Function (BRIEF) (171) Delis-Kaplan Executive Function System (172) Executive Control Battery (173) Stroop Color and Word Test (174) Trail Making Test—Part B (175) Wisconsin Card Sorting Test (176)
Attention/concentration	Delayed Gratification Task (177) Digit Span (Forward and Reversed) (Wechsler scales) (178)
Language/verbal learning	Boston Naming Test (179) Children's Auditory Verbal Learning Test (180) Multilingual Aphasia Examination (181) Token Test—Short Form (182)
Visual perception	Developmental Test of Visual Perception, 2nd ed. (183) Test of Visual Perceptual Skills (184)
Academic-general	Kaufman Tests of Educational Achievement, 2nd ed. (185) Peabody Individual Achievement Test-III (186) Wechsler Individual Achievement Test, 3rd ed. (187) Woodcock Johnson, 3rd ed.; Tests of Academic Achievement (188)
Academic-targeted	Key Math Diagnostic Test (189) Woodcock Reading Mastery Tests, 3rd ed. (190)
Behavior	Child Behavior Checklist (ASEBA Preschool and School Age) (191)
Social behavior	Behavior Assessment System for Children, 2nd ed. (BASC-II) (192) School Social Behavior Rating Scale (SSBR) (193)
Adaptive behavior	Adaptive Behavior Assessment System, 2nd ed. (ABAS-II) (194) Scales of Independent Behavior-Revised (SIB-R) (195) Vineland Adaptive Behavior Scales, 2nd ed. (VABS-II) (196)
Motor skills	Grooved Pegboard (197)

chologist, school psychologist, or other certified specialist may use individually-administered tests to assess the student's skills in the aforementioned domains. Two recent reviews (146,151) provide examples of the neuropsychological and psychoeducational tests used in schools (Table 37-2).

These batteries or more narrowly focused tests should be used, when necessary, to target specific areas of suspected disability or concern in conjunction with observation, behavior checklists, curriculum-based measurement, and other context-based measures as described earlier. Many of the aforementioned tests require standardized administration, including timed tasks, specific cut-off points, and scripted instructions for items in order to provide scorable results based on testing norms. However, students with brain injury often require additional time to process information, and would be penalized for slow or partial responses on such standardized measures. If the goal of the assessment is to compare the student's performance with typically develop-

AQ4

ing peers, then measures should be administered as directed. If, however, the goal is to gather information about the student's ability to perform given appropriate accommodations and modifications (additional time on tests), then the efficacy of various accommodations could tested during the assessment.

Special Test Considerations

Prior to assessment, examiners should be familiar with strategies to address potential problems confronting many students with TBI. These include cognitive and physical fatigue (198–199), attention deficits (200), memory problems (201), delayed processing and response time, low motivation or apathy (202), and impulse control deficits. For example, a test requiring extended focus and engagement may be broken into subtests administered at separate times to minimize cognitive fatigue. Attention problems may be managed more effectively in a quiet setting with few distractions (hallway noise, clocks, alarms, people entering and leaving the room), and may require more frequent and consistent reinforcement of student effort with age-appropriate positive contingencies (203). For tests that are untimed, examiners should allow the student sufficient time to respond to questions. Potential problems with motivation could be addressed prior to testing by asking parents or teachers to identify things that are reinforcing to the student (202,204). If the test is nonstandardized (or administered in a nonstandard way) students with short-term memory deficits may benefit from precorrections (reminders of the expected response type) before each response set. Examiner awareness of the challenges often associated with TBI can help build therapeutic rapport with the student so that a valid sample of performance is obtained during testing.

Individual Education Plan Development

Once a student is found eligible for special education services, the team (including parents) develops the student's IEP that describes the type and amount of specially designed instruction, the settings in which instruction takes place, and any accommodations or related services the student needs to benefit from school. Related services could include instruction from a speech-language pathologist, a behavioral plan for the classroom, and/or participation in a social skills group. The IEP written for a child with TBI will require procedures that vary from traditional IEP development in several ways (205). Because of the underlying medical cause of the disability, the initial IEP requires a joint venture among the health care facility, the school, and the family. Information from a variety of sources and disciplines outside the school system needs to be translated and used to determine the child's current levels of functioning. Rapidly changing needs will require the child's IEP review to be conducted more frequently than required by law (e.g., every 3–4 months initially).

Related Services

Ideally, students returning to school following a TBI have access to a variety of concomitant outpatient services with therapists specially trained to serve pediatric and adolescent TBI populations. Unfortunately, although access to such services is sometimes available in large urban settings (if the child has the appropriate insurance or qualifies for government assistance), in reality there is generally a lack of such services for most children in the school setting (206,207).

A variety of supportive services that may be required to assist the child to benefit from special education are also available through IDEA. These related services can include physical therapy, occupational therapy, speech-language therapy, audiology services, psychological services, recreation therapy, counseling services, social work services, school health services, parent counseling and training, and transportation.

As a child with TBI transitions from the hospital/rehabilitation setting back to school, questions often arise as to funding sources for related services, as there is no clear demarcation between rehabilitation services and those services that are a necessary part of the child's education. According to IDEA, children are entitled to receive ''related services'' deemed ''educationally relevant.'' How individual districts interpret educational relevance is often open to debate. For example, a school district might argue that physical therapy to increase the head control of a student who is severely injured is rehabilitation therapy; others could argue that it is educationally relevant therapy because increasing head control might allow the student to use a head switch to access a computer in the school setting. In many cases, as students with TBI transition from the medical or rehabilitation setting to school, they receive a combination of educationally based therapy at school and outpatient medical therapy that is paid for by their insurance providers or Medicaid.

Special Education Placements and Settings

Although IDEA requires that students with disabilities, including TBI be educated in the least restrictive environment (LRE) ''to the maximum extent possible,'' a full continuum of options regarding where children can receive services is available. This can include general education classes, special education classes (e.g., resource rooms, self-contained classes), special education schools, hospitals, public or private institutions, and instruction at home. There are many factors to consider in making a decision about the LRE decision and there are no standardized procedures to follow (208–210). However, IEP teams can use both case law and guidelines put forward by researchers who have examined LRE placement policy to inform their decision-making (e.g., Cheatham et al. [211]; Rozalski and Stewart [212]). In general, the child's team, based on considerations of the child's unique needs and the LRE in which those needs can be addressed, makes placement decisions. Frequent progress monitoring of student performance is helpful in guiding changes and adaptations in support provided, which might include changes in instructional setting and content.

For example, a school team may decide that a student returning to school with moderate deficits in memory, processing speed, and verbal comprehension following a TBI may best be served in the general education classroom with support from the special education teacher delivered within the child's own classroom. In another case, a school team may determine that the most appropriate placement for a student with severe language and learning problems as a result of a TBI is a self-contained classroom in the student's home school. There the student can receive more needed

one-on-one learning time, yet still participate with general education peers in daily activities such as lunch, recess, art, and music class. In keeping with the intent of the law, it is unusual for a school team to recommend a placement such as a special day school or residential placement. These options are costly and are not available in many areas. Moreover, with school systems currently serving a number of students who have severe or profound disabilities as a result of various conditions, the medical needs of the child with TBI should not be a hindrance to an education in the LRE. In some cases, a residential placement or special school may be necessary if a school district is unable to provide supports that allow the student to benefit from the educational program. In the end, the child's IEP team, including medical and rehabilitation providers who have treated the student, must consider the specific needs of the student, the quality and type of resources available within the school district, and the legal mandate to place the child in the LRE to makes recommendations about school placement.

Specially Designed Instruction

Regardless of the setting, the term *special education* involves ''specially designed instruction,'' which IDEA defines as instruction that ''adapts the content, methodology, or delivery of instruction to address the unique needs of the child that result from the child's disability'' [34 CFR §300.39(b)(3)]. The purpose of the specially designed instruction is to ensure the child gains access to the general curriculum so that he or she can meet the educational standard that applies to all children within the jurisdiction of the public agency (school district or state). Although there is very little empirical evidence of the effectiveness of interventions to promote positive educational outcomes for children and youth following a TBI (213,214), a number of promising practices can be identified from research with children with other disability labels (131,144). Because children with TBI share commonalities with children with other disabilities, this research can provide guidance for educators working with students with TBI.

Perhaps the most critical factor in educating students with TBI is ensuring high levels of accuracy in their academic work; there is a strong correlation between maintaining high rates of learner success and increased acquisition and retention of newly learned information (215–217). The provision of guided practice (218–221) and cumulative review (222) address inefficient and inconsistent learning characteristics of students with TBI. Students with TBI also benefit from using well-rehearsed instructional routines or strategies. Instructional routines consist of a set of steps applicable across a range of examples (e.g., consistent sequence of steps for solving math story problems) (218,221,223). Brisk instructional pacing, appropriately adjusted to the student's response rate, can increase the acquisition rate of new material (224). Providing systematic corrective feedback (225,226) is important for students with learning and memory problems after TBI (216,227,228); immediate, nonjudgmental feedback is critical to improving accuracy when the task is presented again. Table 37-3 presents a summary of research-based instructional strategies that address cognitive characteristics common to many students with TBI.

TABLE 37-3 Evidence-Based Instructional Practices and Strategies (132)

INSTRUCTIONAL STRATEGY	DESCRIPTION	TBI CHARACTERISTIC
Appropriate pacing	Delivering material in small increments and requiring responses at a rate consistent with a student's processing speed increases acquisition of new material	• Fluctuating attention • Decreased speed of processing
High rates of success	Acquisition and retention of new information tends to increase with high rates of success	• Memory impairment • High rates of failure
Task analysis	Careful organization of learning tasks, including systematic sequencing of teaching targets	• Organizational impairment • Inefficient learning
Sufficient practice and review (including cumulative review)	Acquisition and retention of new information is increased with frequent review	• Inefficient learning • Inconsistency
Corrective feedback	Learning is enhanced when errors are followed by nonjudgmental corrective feedback	• Inefficient feedback loops • Implicit learning of errors
Teaching to mastery	Learning is enhanced with mastery at the acquisition phase	• Possibility of gaps in the knowledge base
Facilitation of generalization	Generalizable strategies and general case teaching (wide range of examples and settings) increases generalization	• Frequent failure of transfer • Concrete thinking and learning
Ongoing assessment	Adjustment of teaching based on ongoing assessment of students' progress facilitates learning	• Inconsistency • Unpredictable recovery

In addition to the evidence supporting specific instructional strategies, there is substantial research on the efficacy of metacognitive interventions in promoting student success (217,218). Designed to facilitate a strategic approach to difficult academic tasks, metacognitive strategies are procedures that students can use to improve their performance across a variety of academic tasks. Strategies can be task specific or more general. For example, a self-regulatory self-talk strategy like ''I need to check my work'' is generally applicable to a wide variety of academic tasks. Using a graphic organizer for writing a story is an example of a metacognitive strategy that is task-specific.

Educational Accommodations

Educational accommodations allow students with disabilities to access the same curriculum as their peers through changes in teaching methods and/or materials. For example, a student with memory problems may require multisensory presentations or a child with vision deficits may require large print books to be able to work towards the same goals as their classmates in the general education classroom. Children returning to a general education setting following TBI will more than likely require multiple accommodations. Table 37-4 presents examples of educational accommodations that address cognitive and physical characteristics common to many students with TBI. These accommodations can be successfully employed in general education settings or in the context of special education environments. Accommodations such as these minimize the student's deficits and allow him or her to remain in a less restrictive school environment.

Behavioral and Social Support Strategies

Individual education plans for students with TBI often include social and behavioral goals, as difficulties with EF, including impulse control and control of attention, are common sequelae of TBI (22,24,203). Addressing behavioral challenges is often difficult and time intensive for school staff, however, appropriate school and social behavior is critical to student success (229). There is a large research base on strategies to support students with behavioral issues including Functional Behavior Assessment; monitored trials of accommodations and modifications, for example, modified schedule, preferential seating, and so forth; small group instruction; and individual behavioral interventions (230). Collaboration with district or outside agency specialists such as vocational rehabilitation counselors, transition specialists, therapists, and so forth, may also be useful (146). Table 37-5 includes validated approaches to behavioral and social intervention.

504 Eligibility

Although TBI often affects learning, not all students with TBI need, or are eligible for, assistance under IDEA. Some students are able to participate in the general education program with supports and accommodations provided through

TABLE 37-4 Educational Accommodations

COMMON DEFICITS FOLLOWING TBI	CLASSROOM EXAMPLES	POSSIBLE ACCOMMODATIONS
Fatigue	Student struggles to stay alert in class; physical exhaustion impacts student's learning	Modified school day; schedule most taxing courses early in day; rest breaks
Attention/concentration	Student is unable to sustain or maintain focus to complete task or activities; is easily distracted; if interrupted cannot go back and pick up where he or she left off	Reduce distractions in student's work area; divide work into smaller sections; use verbal or nonverbal cueing system to remind student to pay attention
Memory	Student has difficulty remembering instructions; is able to read assigned chapter, but cannot recall what was read; does well on daily assignment, but poorly on tests	Provide written instructions for student; shorten reading passages; frequently repeat and summarize information; link new information to student's relevant prior knowledge
Organization	Student is often late to class; comes to class without necessary materials; does not automatically carry out the class schedule; does not remember what class is next; leaves out steps in a project or when solving a complex problem	Assign person to review schedule at start of school day and organize materials for each class; use color-coded materials for each class (book, notebook, supplies); provide written schedule of daily routine and give reinforcement for referring to schedule; provide written checklist for complex tasks
Processing speed	When called on in class, student does not respond right away, gives appearance of not attending or knowing the answer; has difficulty carrying out multi-step directions; performs poorly on timed tests	Give student advanced notice he or she is going to be called on; allow extra time for the student to respond when answering; supply written set of directions; provide extended time on assignments and tests
Visual–motor	Student has difficulty copying problems from the blackboard; decreased motor speed makes keeping up with taking lecture notes impossible; visual field deficit causes student to ignore information presented on right side	Assign someone to take notes for student during lectures; provide copy of problems on blackboard; allow for alternatives to paper-pencil writing (oral responses, computer); provide preferential seating to maximize visual field

TABLE 37-5 Integrated Approaches to Behavioral and Social Intervention (132)

APPROACH	DESCRIPTION	TBI CHARACTERISTIC
Self-awareness/ attribution training	Facilitation of students' understanding of their role in learning; validated for students with learning difficulties (231)	• Decreased self-awareness • Denial of deficits
Cognitive behavior modification	Facilitation of self-control of behavior; validated with adolescents with ADHD and aggressive behavior (232)	• Weak self-regulation related to frontal lobe injury • Disinhibited and potentially aggressive behavior
Positive, antecedent-focused behavior supports	Approach to behavior management that focuses primarily on the antecedents of behavior (in a broad sense); validated in developmental disabilities and with some TBI subpopulations (233,234)	• Impulsive behavior • Inefficient learning from consequences • History of failure • Defiant behavior • Initiation impairment • Working memory impairment
Circle of friends	A set of procedures designed to support students' social life and ongoing social development; validated in developmental disabilities and TBI (235,236)	• Frequent loss of friends • Social isolation • Weak social skills

Abbreviations: ADHD, attention deficit hyperactivity disorder.

a Section 504 plan (237). This civil rights act protects individuals from discrimination based on their disability, ensuring individuals' equal rights to participate in and have access to program benefits and services, including public education. The definitions of disability in this law are broader and more inclusive than those in IDEA; an individual with a disability is someone with a physical or mental impairment that substantially limits 1 or more major life activities, such as caring for oneself, walking, seeing, hearing, speaking, breathing, working, performing manual tasks, and learning (238). The Rehabilitation Act Section 504 is a civil rights law that applies to *all* settings, not just public school, so it continues to protect individuals from discrimination after high school graduation. A written 504 plan might include accommodations to address physical, cognitive, or behavioral needs, including, for example, a reduced schedule to compensate for fatigue, a note taker for fine motor difficulties, or increased time to complete tests and assignments to compensate for processing delays.

Transition Planning or Services

Under IDEA, transition services are mandated for all students with disabilities beginning at age 16 (141). The law specifies that each student have an IEP to facilitate movement from school to post-school life, that the plan take into account the student's abilities, preferences, and interests, and include measurable postsecondary goals (239). The plan must include instruction, services, experiences, development of objectives for employment and adult living, and acquisition of living and vocational skills. The National Secondary Training and Technical Assistance Center (NSTTAC) recommends that transition plans incorporate the following evidence-based practices: (*a*) transition planning focused on post-school goals and self-determination; (*b*) help coordinating postsecondary plans with adult agencies; (*c*) instruction in academic, vocational, independent living, and personal–social content areas; (*d*) support for completing high school; and (*e*) paid job training while in the program and help securing employment or entering postsecondary training on leaving the program (240).

Building Capacity of Educators: Recommendations for Teacher Training

There continues to be a lack of awareness of the impact of TBI on school performance (112). Numerous resources exist for educators who want to learn more about childhood TBI (e.g., http://cokidswithbraininjury.com/, http://www.la-publishing.com, http://www.projectlearnet.org/, http://www.brainlinekids.org/). Further, with the increased awareness of the impact of concussion on young learners and the need for schools to address these students' needs, a variety of new resources have been developed (e.g., http://brain101.orcasinc.com/, http://www.cdc.gov/concussion/HeadsUp/schools.html).

The challenge remains that many teachers leave their university training programs with little or no training in TBI (241–243). Training for general education teachers in working with students with TBI is minimal (109,110,244), and most special education teacher preparation programs offer training in strategies designed to support students with higher incidence disabilities (e.g., Specific Learning Disability and attention-deficit/hyperactivity disorder) (245).

More comprehensive teacher training efforts in TBI have focused on training educators who are currently working in schools (137,138). The past 30 years of research on professional development for educators points to a number of critical components for effectiveness regardless of the particular subject or method being taught. To have an impact on students, training and support for educators must

- require teachers to practice new skills in the school environment (246–250);
- provide access to sufficient organizational supports (251);
- include information about the causes, incidence, treatment, outcomes, and challenges of TBI;

- include a variety of evidence-based strategies (252,253);
- include consultation on implementation of new skills in the instructional setting (e.g., Bowen [254]; Fuchs and Fuchs [255]; Gersten et al. [256]; Sailors and Price [257]); and
- be of sufficient duration (e.g., 7–8 sessions) to produce long-term sustained use of new strategies in the instructional setting (250,258,259).

There are currently 2 teacher training models that incorporate these features in use with educators serving students with TBI: the TBI Consulting Team model (137) and Brain-STARS (260–262). Although these models show promise, both lack evidence of impact on child outcome, which is the standard for evaluating the effectiveness of professional development models (263–265).

CONCLUSION

Although hospitals treat children and adolescents with TBI in their initial course of recovery, it is ultimately the school system that serves as the long-term provider of services for this population. Because TBI has significant and on-going effects on academic, cognitive, and psychosocial functioning, in 1991 TBI was added to the list of disabilities that qualify students for special education services under IDEA, and thus students, if identified, can receive an array of supports to address individual needs. However, despite the fact that the foundation for providing appropriate service to students with TBI exists in special education law, students with TBI continue to experience significant challenges in school and as a group experience poor PSO.

For students with TBI, school performance is most often affected by executive dysfunction, social behavioral problems, and a progressive lag in academic achievement. Several factors have been found to mediate and moderate the effect of TBI on school performance. Early injury is associated with poorer outcomes than later injury, and generally more severe TBI is associated with more negative outcomes. Family environmental characteristics, such as SES, overall family functioning, and parenting behavior can also significantly affect student educational performance. In addition to child- and family-centered factors, a range of environmental variables negatively affect student outcomes. For example, the lack of training in TBI for educators, as well as ineffective hospital–school communication, has led to underidentification of children with TBI for special education. Adversarial parent–educator relationships have often hampered the design of educational programs for students with TBI.

Like other students with disabilities, students with TBI need and deserve to be promptly and accurately identified so they can be appropriately served by educators who are knowledgeable about the challenges they experience and who can implement effective instructional and behavioral strategies. Because most parents of students with TBI will have had no prior experience with special education, school systems should provide information and link parents with skilled advocates. Linking students with TBI and their families to community-based resources—throughout their school years but especially at transition from high school—should be a high priority for the IEP team.

These improvements in service delivery will involve systemic changes. Well-developed preservice and in-service training programs for school personnel will help educators accurately identify students with TBI, implement effective educational practices, develop strategies for collaborating with parents, and link students to appropriate community-based supports as they leave high school. Well-established hospital–school linkages with school reentry protocols will help to increase identification rates and ensure smooth transitions back to school. Significantly improving outcomes for students with TBI will require comprehensive research efforts that examine these and other efficacious interventions and bringing these interventions into broader use through a coordinated process of development, training, technical assistance, and dissemination.

KEY CLINICAL POINTS

1. Reduced hospital stays has resulted in children with significant needs returning to school with little or no support from medical or community-based agencies; the primary service provider for children and adolescents has become the school.
2. For students with moderate to severe injury, the rate of academic achievement gains tends to slow progressively over time, and the effects are long-term. Changes in social behavior affect not only functional aspects of daily living but also quality of life.
3. A growing body of research indicates that post-high school outcomes for many students with TBI are poor.
4. Effective instructional and behavioral support strategies implemented by trained educators can help mitigate the academic and behavioral challenges associated with childhood TBI.
5. Instructional methodologies that have proven effective with learners with different disability labels but similar functional challenges can be used effectively with students with TBI.
6. Improve identification of students with TBI for special education services could lead to more effective provision of educational and social/behavioral support strategies tailored to students' specific needs.
7. To lead to positive student outcomes, training and support for educators must include training in evidence-based interventions, supervised practice in both the training site and classroom, and continued mentoring, feedback, and consultation in the classrooms.

KEY REFERENCES

1. Babikian T, Asarnow R. Neurocognitive outcomes and recovery after pediatric TBI: meta-analytic review of the literature. *Neuropsychology*. 2009;23(3):283–296.
2. Taylor HG, Swartwout MD, Yeates KO, Walz NC, Stancin T, Wade SL. Traumatic brain injury in young children: postacute effects on cognitive and school readiness skills. *J Int Neuropsychol Soc*. 2008;14(5):734–745.
3. Todis B, Glang A, Bullis M, Ettel D, Hood D. Longitudinal investigation of the post-high school transition experi-

ences of adolescents with traumatic brain injury. *J Head Trauma Rehabil*. 2011;26(2):138–149.
4. Yeates KO, Anderson V. Childhood traumatic brain injury, executive functions, and social outcomes: toward an integrative model for research and clinical practice. In: Anderson V, Jacobs R, Anderson PJ, eds. *Executive Functions and the Frontal Lobes: A Lifespan Perspective*. Philadelphia, PA: Taylor & Francis; 2008:243–267.
5. Ylvisaker M, Todis B, Glang A, et al. Educating students with TBI: themes and recommendations. *J Head Trauma Rehabil*. 2001;16(1):76–93.

RECOMMENDED WEBSITES

http://www.cbirt.org
http://www.LearNet.org
http://www.cokidswithbraininjury.com

References

1. Faul M, Xu L, Wald MM, Coronado VG. *Traumatic Brain Injury in the United States: Emergency Department Visits, Hospitalizations and Deaths 2002–2006*. Atlanta, GA: Centers for Disease Control and Prevention; 2010.
2. Zaloshnja E, Miller T, Langlois JA, Selassie AW. Prevalence of long-term disability from traumatic brain injury in the civilian population of the United States, 2005. *J Head Trauma Rehabil*. 2008;23(6):394–400.
3. Hosack K, Rocchio C. Serving families of persons with severe brain injury in an era of managed care. *J Head Trauma Rehabil*. 1995;10(2):57.
4. Shigaki C, Hagglund K, Clark M, Conforti K. Access to health care services among people with rehabilitation needs receiving Medicaid. *Rehabil Psychol*. 2002;47(2):204–218.
5. Conoley J, Sheridan S. Pediatric traumatic brain injury: challenges and interventions for families. *J Learn Disabil*. 1996;29(6):662–669.
6. Batavia A, DeJong G, Eckenhoff EA, Materson RS. After the Americans with Disabilities Act: the role of the rehabilitation community. *Arch Phys Med Rehabil*. 1990;71(12):1014–1015.
7. Kirkwood MW, Yeates KO, Taylor HG, Randolph C, McCrea M, Anderson VA. Management of pediatric mild traumatic brain injury: a neuropsychological review from injury through recovery. *Clin Neuropsychol*. 2008;22(5):769–800.
8. McKinlay A, Dalrymple-Alford JC, Horwood LJ, Fergusson DM. Long term psychosocial outcomes after mild head injury in early childhood. *J Neurol Neurosurg Psychiatry*. 2002;73(3):281–288.
9. Hessen E, Nestvold K, Sundet K. Neuropsychological function in a group of patients 25 years after sustaining minor head injuries as children and adolescents. *Scand J Psychol*. 2006;47(4):245–251.
10. Brown G, Chadwick O, Shaffer D, Rutter M, Traub M. A prospective study of children with head injuries: III. Psychiatric sequelae. *Psychol Med*. 1981;11(1):63–78.
11. Massagli TL, Fann JR, Burington BE, Jaffe KM, Katon WJ, Thompson RS. Psychiatric illness after mild traumatic brain injury in children. *Arch Phys Med Rehabil*. 2004;85:1428–1434.
12. Collins MW, Lovell MR, Iverson GL, Cantu RC, Maroon JC, Field M. Cumulative effects of concussion in high school athletes. *Neurosurgery*. 2002;51:1175–1179.
13. Guskiewicz KM, Marshall SW, Bailes J, et al. Association between recurrent concussion and late-life cognitive impairment in retired professional football players. *Neurosurgery*. 2005;57:719–726.
14. Ponsford J, Willmott C, Rothwell A, et al. Cognitive and behavioral outcome following mild traumatic head injury in children. *J Head Trauma Rehabil*. 1999;14(4):360–372.
15. Swaine BR, Tremblay C, Platt RW, Grimard G, Zhang X, Pless IB. Previous head injury is a risk factor for subsequent head injury in children: a longitudinal cohort study. *Pediatrics*. 2007;119(4):749–758.
16. Luis CA, Mittenberg W. Mood and anxiety disorders following pediatric traumatic brain injury: a prospective study. *J Clin Exp Neuropsychol*. 2002;24(3):270–279.
17. Smith-Seemiller L, Fow NR, Kant R, Franzen MD. Presence of post-concussion syndrome symptoms in patients with chronic pain vs. mild traumatic brain injury. *Brain Inj*. 2003;17(3):199–206.
18. Ewing-Cobbs L, Prasad MR, Landry SH, Kramer L, DeLeon R. Executive functions following traumatic brain injury in young children: a preliminary analysis. *Dev Neuropsychol*. 2004;26(1):487–512.
19. Yeates KO, Anderson V. Childhood traumatic brain injury, executive functions, and social outcomes: toward an integrative model for research and clinical practice. In: Anderson V, Jacobs R, Anderson PJ, eds. *Executive Functions and the Frontal Lobes: A Lifespan Perspective*. Philadelphia, PA: Taylor & Francis; 2008:243–267.
20. Cattelani R, Lombardi F, Brianti R, Mazzucchi A. Traumatic brain injury in childhood: intellectual, behavioural, and social outcome into adulthood. *Brain Inj*. 1998;12(4):283–296.
21. Klonoff H, Clark C, Klonoff PS. Long-term outcome of head injuries: a 23 year follow up study of children with head injuries. *J Neurol Neurosurg Psychiatry*. 1993;56(4):410–415.
22. Chapman LA, Wade SL, Walz NC, Taylor HG, Stancin T, Yeates KO. Clinically significant behavior problems during the initial 18 months following early childhood traumatic brain injury. *Rehabil Psychol*. 2010;55(1):48–57.
23. Babikian T, Asarnow R. Neurocognitive outcomes and recovery after pediatric TBI: Meta-analytic review of the literature. *Neuropsychology*. 2009;23(3):283–296.
24. Catroppa C, Anderson VA, Morse SA, Haritou F, Rosenfeld JV. Outcome and predictors of functional recovery 5 years following pediatric traumatic brain injury (TBI). *J Pediatr Psychol*. 2008;33(7):707–718.
25. Asikainen I, Kaste M, Sarna S. Patients with traumatic brain injury referred to a rehabilitation and re-employment programme: social and professional outcome for 508 Finnish patients 5 or more years after injury. *Brain Inj*. 1996;10(12):883–899.
26. Yeates KO, Taylor HG, Wade SL, Drotar D, Stancin T, Minich N. A prospective study of short- and long-term neuropsychological outcomes after traumatic brain injury in children. *Neuropsychology*. 2002;16(4):514–523.
27. Vu J, Babikian T, Asarnow RF. Academic and language outcomes in children after traumatic brain injury: a meta-analysis. *Except Child*. 2011;77(3):263–281.
28. Ewing-Cobbs L, Barnes MA, Fletcher JM. Early brain injury in children: development and reorganization of cognitive function. *Dev Neuropsychol*. 2003;24(2–3):669–704.
29. Anderson V, Catroppa C, Morse S, Haritou F, Rosenfeld J. Functional plasticity or vulnerability after early brain injury? *Pediatrics*. 2005;116(6):1374–1382.
30. Tonks J, Yates P, Williams WH, Frampton I, Slater A. Peer-relationship difficulties in children with brain injuries: comparisons with children in mental health services and healthy controls. *Neuropsychol Rehabil*. 2010;20(6):922–935.
31. Sohlberg MM, Mateer C. *Cognitive Rehabilitation: An Integrated Neuropsychological Approach*. New York, NY: Guilford Publication; 2001.
32. Anderson VA, Anderson P, Northam E, Jacobs R, Catroppa C. Development of executive functions through late childhood and adolescence in an Australian sample. *Dev Neuropsychol*. 2001;20(1):385–406.

33. Sohlberg M, Ness B. Practical Strategies for Serving Students with TBI in the Schools. Paper presented at: Brain Injury Association of Oregon; October 5–6, 2007; Portland, OR.
34. Harvey VS. Best practices in teaching study skills. In: Thomas A, Grimes J, eds. *Best Practices in School Psychology IV*. Vol 1. Bethesda, MD: National Association of School Psychologists; 2002:831–845.
35. Anderson V, Catroppa C. Recovery of executive skills following paediatric traumatic brain injury (TBI): a 2 year follow-up. *Brain Inj*. 2005;19(6):459–470.
36. Cicerone K, Levin H, Malec J, Stuss D, Whyte J. Cognitive rehabilitation interventions for executive function: moving from bench to bedside in patients with traumatic brain injury. *J Cogn Neurosci*. 2006;18(7):1212–1222.
37. Gioia GA, Kenworthy L, Isquith PK. Executive function in the real world: BRIEF lessons from Mark Ylvisaker. *J Head Trauma Rehabil*. 2010;25(6):433–439.
38. Ylvisaker M, Szekeres SF, Feeney T. Cognitive rehabilitation: executive functions. In: Ylvisaker M, ed. *Traumatic Brain Injury Rehabilitation: Children and Adolescents*. Rev. ed. Newton, MA: Butterworth-Heinemann; 1998:221–269.
39. Ylvisaker M, Feeney T. Executive functions, self-regulation, and learned optimism in paediatric rehabilitation: a review and implications for intervention. *Pediatr Rehabil*. 2002;5(2):51–70.
40. Eslinger PJ, Biddle KR. Adolescent neuropsychological development after early right prefrontal cortex damage. *Dev Neuropsychol*. 2000;18(3):297–329.
41. Anderson SW, Damasio H, Tranel D, Damasio AR. Long-term sequelae of prefrontal cortex damage acquired in early childhood. *Dev Neuropsychol*. 2000;18(3):281–296.
42. Morgan AB, Lilienfeld SO. A meta-analytic review of the relation between antisocial behavior and neuropsychological measures of executive function. *Clin Psychol Rev*. 2000;20(1):113–136.
43. Catroppa C, Anderson V, Godfrey C, Rosenfeld JV. Attentional skills 10 years post-paediatric traumatic brain injury (TBI). *Brain Inj*. 2011;25(9):858–869.
44. McKinlay A, Grace RC, Horwood LJ, Fergusson DM, MacFarlane MR. Long-term behavioural outcomes of pre-school mild traumatic brain injury. *Child Care Health Dev*. 2010;36(1):22–30.
AQ5 45. The University of the State of New York. *Traumatic Brain Injury: A Guidebook for Educators*. Albany, NY: The State Education Department, Office of Special Education Services; 1997. http://www.rojectlearnet.org/for teachers.html. Accessed July 27, 2011.
46. Conklin H, Salorio C, Slomine B. Working memory performance following paediatric traumatic brain injury. *Brain Inj*. 2008;22(11):847–857.
47. Begali V, ed. *Head Injury in Children and Adolescents: A Resource and Review for School and Allied Professionals*. 2nd ed. Brandon, VT: Clinical Psychology; 1992.
48. Bulgren JA, Schumaker JB. Teaching practices that optimize curriculum access. In: Deshler DD, Schumaker JB, eds. *Teaching Adolescents with Disabilities: Accessing the General Education Curriculum*. Thousand Oaks, CA: Corwin Press; 2006:79–120.
49. Anderson V, Jacobs R, Spencer-Smith M, et al. Does early age at brain insult predict worse outcome? Neuropsychological implications. *J Pediatr Psychol*. 2010;35(7):716–727.
50. Greenham M, Spencer-Smith MM, Anderson PJ, Coleman L, Anderson VA. Social functioning in children with brain insult. *Front Hum Neurosci*. 2010;4:22.
51. Tonks J, Slater A, Frampton I, Wall SE, Yates P, Williams WH. The development of emotion and empathy skills after childhood brain injury. *Dev Med Child Neurol*. 2009;51(1):8–16.
52. Turkstra LS. Should my shirt be tucked in or left out? The communication context of adolescence. *Aphasiology*. 2000;14(4):349–364.
53. Turkstra L, McDonald S, DePompei R. Social information processing in adolescents: data from normally-developing adolescents and preliminary data from their peers with traumatic brain injury. *J Head Trauma Rehabil*. 2001;16(5):469–483.
54. Ylvisaker M, Feeney T. Pediatric brain injury: social, behavioral, and communication disability. *Phys Med Rehabil Clin N Am*. 2007;18(1):133–44, vii.
55. Yeates KO, Swift E, Taylor HG, et al. Short- and long-term social outcomes following pediatric traumatic brain injury. *J Int Neuropsychol Soc*. 2004;10(3):412–426.
56. Yeates KO, Bigler ED, Dennis M, et al. Social outcomes in childhood brain disorder: a heuristic integration of social neuroscience and developmental psychology. *Psychol Bull*. 2007;133(3):535–556.
57. Muenchberger H, Kendall E, Neal R. Identity transition following traumatic brain injury: a dynamic process of contraction, expansion and tentative balance. *Brain Inj*. 2008;22(12):979–992.
58. Carroll E, Coetzer R. Identity, grief and self-awareness after traumatic brain injury. *Neuropsychol Rehabil*. 2011;21(3):289–305.
59. Charles N, Butera-Prinzi F. Acquired brain injury: reconstructing meaning following traumatic grief. *Grief Matters: Australian J Grief Bereavement*. 2008;11(2):64–69.
60. Langlois J, Rutland-Brown W, Wald M. The epidemiology and impact of traumatic brain injury: a brief overview. *J Head Trauma Rehabil*. 2006;21(5):375–378.
61. Landau J, Hissett J. Mild traumatic brain injury: impact on identity and ambiguous loss in the family. *Fam Syst Health*. 2008;26(1):69–85.
62. Nance ML, Polk-Williams A, Collins MW, Weibe DJ. Neurocognitive evaluation of mild traumatic brain injury in the hospitalized pediatric population. *Ann Surg*. 2009;249(5):859–863.
63. Anderson V, Catroppa C, Morse S, Haritou F, Rosenfeld JV. Intellectual outcome from preschool traumatic brain injury: a 5-year prospective, longitudinal study. *Pediatrics*. 2009;124(6):e1064–e1071.
64. Ashman TA, Cantor JB, Gordon WA, et al. Objective measurement of fatigue following traumatic brain injury. *J Head Trauma Rehabil*. 2008;23(1):33–40.
65. Cernich AN, Kurtz SM, Mordecai KL, Ryan PB. Cognitive rehabilitation in traumatic brain injury. *Curr Treat Options Neurol*. 2010;12(5):412–423.
66. Thickbroom GW, Mastaglia FL. Plasticity in neurological disorders and challenges for noninvasive brain stimulation (NBS). *J Neuroeng Rehabil*. 2009;6:4.
67. Lane SJ, Schaaf RC. Examining the neuroscience evidence for sensory-driven neuroplasticity: implications for sensory-based occupational therapy for children and adolescents. *Am J Occup Ther*. 2010;64(3):375–390.
68. Todis B, Glang A, Bullis M, Ettel D, Hood D. Longitudinal investigation of the post-high school transition experiences of adolescents with traumatic brain injury. *J Head Trauma Rehabil*. 2011;26(2):138–149.
69. Savage RC, Urbanczyk B. Growing up with a brain injury. *The Perspectives Network*. 1995;V-3.
70. Barnes MA, Dennis M, Wilkinson M. Reading after closed head injury in childhood: effects on accuracy, fluency, and comprehension. *Develop Neuropsychol*. 1999;15:1–24.
71. Ewing-Cobbs L, Fletcher JM, Levin HS, Francis DJ, Davidson K, Miner ME. Longitudinal neuropsychological outcome in infants and preschoolers with traumatic brain injury. *J Int Neuropsychol Soc*. 1997;3(6):581–591.
72. Catroppa C, Anderson V. Intervention approaches for executive dysfunction following brain injury in childhood. In: Anderson V, Jacobs R, Anderson PJ, eds. *Executive Functions and the Frontal Lobes: A Lifespan Perspective*. Philadelphia, PA: Taylor & Francis; 2008:439–469.

73. Ewing-Cobbs L, Prasad MR, Swank P, et al. Arrested development and disrupted callosal microstructure following pediatric traumatic brain injury: relation to neurobehavioral outcomes. *Neuroimage*. 2008;42(2):1305–1315.
74. Taylor HG, Swartwout MD, Yeates KO, Walz NC, Stancin T, Wade SL. Traumatic brain injury in young children: postacute effects on cognitive and school readiness skills. *J Int Neuropsychol Soc*. 2008; 14(5):734–745.
75. Anderson VA, Catroppa C, Dudgeon P, Morse SA, Haritou F, Rosenfeld JV. Understanding predictors of functional recovery and outcome 30 months following early childhood head injury. *Neuropsychology*. 2006;20(1):42–57.
76. Fletcher JM, Ewing-Cobbs L, Francis DJ, Levin HS. Variability in outcomes after traumatic brain injury in children: a developmental perspective. In: Broman SH, Michel ME, eds. *Traumatic Head Injury in Children*. New York, NY: Oxford University Press; 1995:3–21.
77. Schwartz L, Taylor HG, Drotar D, Yeates KO, Wade SL, Stancin T. Long-term behavior problems following pediatric traumatic brain injury: prevalence, predictors, and correlates. *J Pediatr Psychol*. 2003;28(4):251–263.
78. Taylor HG, Yeates KO, Wade SL, Drotar D, Stancin T, Burant C. Bidirectional child-family influences on outcomes of traumatic brain injury in children. *J Int Neuropsychol Soc*. 2001;7(6):755–767.
79. Novack TA, Alderson AL, Bush BA, Meythaler JM, Canupp K. Cognitive and functional recovery at 6 and 12 months post-TBI. *Brain Inj*. 2000;14(11):987–996.
80. Anderson V, Catroppa C, Morse S, Haritou F, Rosenfeld J. Recovery of intellectual ability following traumatic brain injury in childhood: impact of injury severity and age at injury. *Pediatr Neurosurg*. 2000; 32:282–290.
81. Donders J, Nesbit-Greene K. Predictors of neuropsychological test performance after pediatric traumatic brain injury. *Assessment*. 2004;11(4):275–284.
82. Rivara JB, Jaffe KM, Fay GC, et al. Family functioning and injury severity as predictors of child functioning one year following traumatic brain injury. *Arch Phys Med Rehabil*. 1993;74(10):1047–1055.
83. Rivara JB, Jaffe KM, Polissar NL, et al. Family functioning and children's academic performance and behavior problems in the year following traumatic brain injury. *Arch Phys Med Rehabil*. 1994; 75(4):369–379.
84. Taylor HG, Drotar D, Wade S, Yeates KO, Stancin T, Klein S. Recovery from traumatic brain injury in children: the importance of the family. In: Broman S, Michel ME, eds. *Traumatic Head Injury in Children*. New York, NY: Oxford University Press; 1995:188–216.
85. Catroppa C, Anderson V. Recovery of educational skills following paediatric traumatic brain injury. *Pediatr Rehabil*. 1999;3(4):167–175.
86. Fletcher JM, Ewing-Cobbs L, Miner ME, Levin HS, Eisenberg HM. Behavioral changes after closed head injury in children. *J Consult Clin Psychol*. 1990;58(1):93–98.
87. Goldstrohm SL, Arffa S. Preschool children with mild to moderate traumatic brain injury: an exploration of immediate and post-acute morbidity. *Arch Clin Neuropsychol*. 2005;20(6):675–695.
88. Kinsella GJ, Prior M, Sawyer M, et al. Predictors and indicators of academic outcome in children 2 years following traumatic brain injury. *J Int Neuropsychol Soc*. 1997;3(6):608–616.
89. Max JE, Castillo CS, Robin DA, et al. Predictors of family functioning after traumatic brain injury in children and adolescents. *J Am Acad Child Adolesc Psychiatry*. 1998;37(1):83–90.
90. Max JE, Koele SL, Castillo CC, et al. Personality change disorder in children and adolescents following traumatic brain injury. [Erratum appears in *J Int Neuropsychol Soc*. 2000;6(7):854]. *J Int Neuropsychol Soc*. 2000;6(3):279–289.
91. Yeates KO, Taylor HG, Walz NC, Stancin T, Wade SL. The family environment as a moderator of psychosocial outcomes following traumatic brain injury in young children. *Neuropsychology*. 2010; 24(3):345–356.
92. Hawley CA, Ward AB, Magnay AR, Long J. Parental stress and burden following traumatic brain injury amongst children and adolescents. *Brain Inj*. 2003;17(1):1–23.
93. Nacajauskaite O, Endziniene M, Jureniene K, Schrader H. The validity of post-concussion syndrome in children: a controlled historical cohort study. *Brain Dev*. 2006;28(8):507–514.
94. Testa JA, Malec JF, Moessner AM, Brown AW. Predicting family functioning after TBI: impact of neurobehavioral factors. *J Head Trauma Rehabil*. 2006;21:236–247.
95. Nathoo N, Chetty R, van Dellen JR, Barnett GH. Genetic vulnerability following traumatic brain injury: the role of apolipoprotein E. *Mol Pathol*. 2003;56:132–136.
96. Teasdale GM, Murray GD, Nicoll JA. The association between APOE epsilon4, age and outcome after head injury: a prospective cohort study. *Brain*. 2005;128(11):2556–2561.
97. Keenan HT, Hooper SR, Wetherington CE, Nocera M, Runyan DK. Neurodevelopmental consequences of early traumatic brain injury in 3-year-old children. *Pediatrics*. 2007;119(3):e616–e623.
98. Wetherington C, Hooper S. Preschool traumatic brain injury: a review for the early childhood special educator. *Exceptionality*. 2006; 14(3):155–170.
99. Anderson V, Moore C. Age at injury as a predictor of outcome following pediatric head injury. *Child Neuropsychol*. 1995;1:187–202.
100. Wetherington CE, Hooper SR, Keenan HT, Nocera M, Runyan D. Parent ratings of behavioral functioning after traumatic brain injury in very young children. *J Pediatr Psychol*. 2010;35(6):662–671.
101. Hawley CA, Ward AB, Magnay AR, Mychalkiw W. Return to school after brain injury. *Arch Dis Child*. 2004;89(2):136–142.
102. Walz NC, Cecil KM, Wade SL, Michaud LJ. Late proton magnetic resonance spectroscopy following traumatic brain injury during early childhood: relationship with neurobehavioral outcomes. *J Neurotrauma*. 2008;25(2):94–103.
103. Muscara F, Catroppa C, Eren S, Anderson V. The impact of injury severity on long-term social outcome following paediatric traumatic brain injury. *Neuropsychol Rehabil*. 2009;19(4):541–561.
104. Koskiniemi M, Kyykkä T, Nybo T, Jarho L. Long-term outcome after severe brain injury in preschoolers is worse than expected. *Arch Pediatr Adolesc Med*. 1995;149(3);249–254.
105. Nybo T, Sainio M, Muller K. Stability of vocational outcome in adulthood after moderate to severe preschool brain injury. *J Int Neuropsychol Soc*. 2004;10(5):719–723.
106. Todis B, Glang A. Redefining success: results of a qualitative study of postsecondary transition outcomes for youth with traumatic brain injury. *J Head Trauma Rehabil*. 2008;23(4):252–263.
107. US Department of Education. 2004. National Longitudinal Transition Study 2 (NLTS-2) Web site. http://www.nlts2.org/index.html. Accessed August 1, 2011.
108. US Bureau of Labor Statistics. 2006. *Current Population Survey* (Employed persons by detailed occupation, sex, and age, Annual Average). http://www.bls.gov/cps/home.htm#data. Accessed August 1, 2011.
109. Chapman JK. Traumatic brain injury: a regional study of rural special and general education preparation experiences. *Rural Spec Educ Q*. 2000;19(2):3–14.
110. Chapman JK. Traumatic brain injury: a five state study of special and general education preparation experiences. *Physical Disabilities: Education and Related Services*. 2005;21(1):17–34.
111. Glang A, Dise-Lewis J, Tyler J. Identification and appropriate service delivery for children who have TBI in schools. *J Head Trauma Rehabil*. 2006;21(5):411–412.
112. Bersani H, Glang A. What is taught about TBI: an analysis of TBI content in 54 teacher preparation textbooks. In press.

113. Langlois JA, Rutland-Brown W, Thomas KE. The incidence of traumatic brain injury among children in the United States: differences by race. *J Head Trauma Rehabil*. 2005;20(3):229–238.
114. US Department of Education. *Twenty-Ninth Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act*. Vol 2. Washington DC: US Department of Education; 2007: Table 1–9.
115. Donders J. Academic placement after traumatic brain injury. *J School Psychol*. 1994;32:53–65.
116. Ewing-Cobbs L, Fletcher JM, Levin HS, Iovino I, Miner ME. Academic achievement and academic placement following traumatic brain injury in children and adolescents: a two-year longitudinal study. *J Clin Exp Neuropsychol*. 1998;20(6):769–781.
117. Miller LJ, Donders J. Prediction of educational outcome after pediatric traumatic brain injury. *Rehabil Psychol*. 2003;48(4):237–241.
118. Taylor HG, Yeates KO, Wade SL, Drotar D, Stancin T, Montpetite M. Long-term educational interventions after traumatic brain injury in children. *Rehabil Psychol*. 2003;48(4):227–236.
119. Cantor JB, Gordon WA, Schwartz ME, Charatz HJ, Ashman TA, Abramowitz S. Child and parent responses to a brain injury screening questionnaire. *Arch Phys Med Rehabil*. 2004;85(4)(suppl 2): S54–S60.
120. McCaleb KN. The relationship between brain injury and the provision of school services. *Physical Disabilities: Education and Related Services*. 2006;25(1):61–76.
121. DiScala C, Osberg JS, Savage RC. Children hospitalized for traumatic brain injury: Transitions to post-acute care. *J Head Trauma Rehabil*. 1997;12(2):1–10.
122. Glang A, Todis B, Thomas C, Hood D, Bedell G, Cockrell J. Return to school following childhood TBI: who gets services? *NeuroRehabilitation*. 2008;23(6):477–486.
123. Sharp NL, Bye RA, Llewellyn GM, Cusick A. Fitting back in: adolescents returning to school after severe acquired brain injury. *Disabil Rehabil*. 2006;28(12):767–778.
124. Darling RB. Parent-professional interaction: the roots of misunderstanding. In: Seligman M, ed. *The Family With a Handicapped Child: Understanding and Treatment*. Orlando, FL: Grune & Stratton; 1983: 175–202.
125. Turnbull AP, Turnbull HR. *Families, Professionals, and Exceptionality: A Special Partnership*. Columbus, Ohio: Charles E Merrill; 1986.
126. Walker BR. Creating effective educational programs through parent-professional partnerships. In: Glang A, Singer GHS, Todis B, eds. *Students With Acquired Brain Injury: The School's Response*. Baltimore, MD: Paul H Brookes; 1996:295–322.
127. Todis B, Glang A, Fabry M. Family, school, child: qualitative study of the school experiences for students with ABI. In: Glang A, Singer GHS, Todis B, eds. *Students With Acquired Brain Injury: The School's Response*. Baltimore, MD: Paul H Brookes; 1996:33–72.
128. Ylvisaker M, Hartwick P, Stevens MB. School reentry following head injury: managing the transition from hospital to school. *J Head Trauma Rehabil*. 1991;6(1):10–22.
129. Savage RC. Identification, classification, and placement issues for students with traumatic brain injuries. *J Head Trauma Rehabil*. 1991; 6(1):1–9.
130. Mira MP, Tyler JS. Students with traumatic brain injury: making the transition from hospital to school. *Focus on Exceptional Children*. 1991;23(5):1–12.
131. Ylvisaker M, Todis B, Glang A, et al. Educating students with TBI: themes and recommendations. *J Head Trauma Rehabil*. 2001;16(1): 76–93.
132. Ylvisaker M, Feeney T, Mullins K. School reentry following mild traumatic brain injury: a proposed hospital-to-school protocol. *J Head Trauma Rehabil*. 1995;10(6):42–49.
133. Donders J, Strom D. The effect of traumatic brain injury on children with learning disability. *Pediatr Rehabil*. 1997;1(3):179–184.
134. Individuals with Disabilities Education Improvement Act of 2004. Pub L No. 108-446, 118 Stat 2647 (2004).
135. Glang, Todis, Ettel, 2011 AQ3
136. The Education for All Handicapped Children Act (PL 94-142), 20 USC §1401 et seq. (1975).
137. Glang A, Tyler J, Pearson S, Todis B, Morvant M. Improving educational services for students with TBI through statewide consulting teams. *NeuroRehabilitation*. 2004;19(3):219–231.
138. Glang A, Todis B, SubletteP, Brown BE, Vaccaro M. Professional development in TBI for educators: the importance of context. *J Head Trauma Rehabil*. 2010;25(6):426–432.
139. Savage RC, DePompei R, Tyler J, Lash M. Paediatric traumatic brain injury: a review of pertinent issues. *Pediatr Rehabil*. 2005;8: 92–103.
140. Dettmer JL, Daunhauer L, Detmar-Hanna D, Sample PL. Putting brain injury on the radar: exploratory reliability and validity analyses of the Screening Tool for Identification of Acquired Brain Injury in School-Aged Children. *J Head Trauma Rehabil*. 2007;22(6): 339–349.
141. Individuals with Disabilities Education Act of 1990, 20 USC §1400 et seq. (1990). http:// idea.ed.gov. Accessed. AQ6
142. Hibbard M, Gordon W, Martin T, Rashkin B, Brown M. *Students with Traumatic Brain Injury: Identification, Assessment, and Classroom Accommodations*. New York, NY: Research and Training Center on Community Integration of Individuals with Traumatic Brain Injury; 2001.
143. Bohmann J. Traumatic brain injury and teens: information for school administrators. *Principal Leadership*. 2007:12–15.
144. Glang A, Ylvisaker M, Stein M, Ehlhardt L, Todis B, Tyler J. Validated instructional practices: application to students with TBI. *J Head Trauma Rehabil*. 2008;23(4):243–251.
145. Arroyos-Jurado EC, Savage TA. Intervention strategies for serving students with traumatic brain injury. *Interv Sch Clin*. 2008;43: 252–254.
146. Cleary M, Scott A. Developments in clinical neuropsychology: implications for school psychological services. *J School Health*. 2010; 81:1–7.
147. Miller DC. *Essentials of School Neuropsychological Assessment*. Hoboken, NJ: John Wiley & Sons Inc; 2007:351–354.
148. Telzrow CF. Role of the school in serving children with learning disabilities. *Semin Neurol*. 1991;11(1):50–56.
149. Merrell KW. *Behavioral, social, and emotional assessment of children and adolescents*. 2nd ed. Mahwah, NJ: Lawrence Erlbaum; 2003: 52–53.
150. Hale JB, Fiorello CA. *School Neuropsychology: A Practitioner's Handbook*. New York, NY: Guilford Press; 2004.
151. Fiorello CA, Hale JB, Decker SL, Coleman S. Neuropsychology in school psychology. In: Garcia-Vazquez E, Crespi TD, Riccio CA, eds. *Handbook of Education, Training and Supervision of School Psychologists in School and Community*. Vol 1. New York, NY: Taylor & Francis; 2009:213–232.
152. Naglieri JA, Das JP. *Cognitive Assessment System*. Itasca, IL: Riverside Publishing; 1997.
153. Hammill DD, Pearson NA, Wiederholt JL. *Comprehensive Test of Nonverbal Intelligence*. 2nd ed. Rolling Meadows, IL: Riverside Publishing; 2009.
154. Elliott CD. *Differential Ability Scales*. 2nd ed. San Antonio, TX: Harcourt Assessment; 2007.
155. Kaufman AS, Kaufman NL. *Kaufman Assessment Battery for Children*. 2nd ed. Circle Pines, MN: AGS Publishing; 2004.
156. Roid GH. *Stanford-Binet Intelligence Scales*. 5th ed. Itasca, IL: Riverside Publishing. 2003.
157. Wechsler D. *Wechsler Primary and Preschool Scale of Intelligence (WPPSI-III)*. 3rd ed. San Antonio, TX: Harcourt Assessment; 2002.

158. Wechsler D. *Wechsler Abbreviated Scale of Intelligence (WASI)*. San Antonio, TX: Harcourt Assessment; 1999.
159. Wechsler D. *The Wechsler Intelligence Scale for Children*. 4th ed. London, United Kingdom: Pearson Assessment; 2004.
160. Woodcock RW, Mather N, McGrew KS. *Woodcock-Johnson III Tests of Cognitive Abilities Examiner's Manual*. Itasca, IL: Riverside Publishing; 2001.
161. Boll T. *Children's Category Test*. San Antonio, TX: Pearson; 1993.
162. Functional Independence Measure (FIM). *Uniform Data System for Medical Rehabilitation*. Buffalo, NY: University of Buffalo; 1996.
163. Lovell M, Maroon J. *ImPACT: Immediate Post-Concussion Assessment and Cognitive Testing*. Pittsburgh, PA: NeuroHealth Systems; 2000.
164. Korkman M, Kirk U, Kemp S. *NEPSY-II*. 2nd ed. San Antonio TX: Pearson, Psychological Corporation; 2007.
165. Randolph C. *Repeatable Battery for the Assessment of Neuropsychological Status (RBANS)*. San Antonio, TX: Pearson, Psychological Corporation; 1998.
166. Cohen M. *Children's Memory Scale*. San Antonio, TX: Pearson, Psychological Corporation; 1997.
167. Conners CK, Staff MHS. *Conners' Continuous Performance Test II: Computer Program for Windows Technical Guide and Software Manual*. North Tonawanda, NY: Multi-Health Systems; 2000.
168. Wechsler D. *Logical Memory I and II subtests of Wechsler Memory Scale*. 4th ed. San Antonio, TX: Psychological Corporation; 2009.
169. Wechsler D. *Wechsler Memory Scale*. 4th ed. San Antonio, TX: Pearson; 2009.
170. Sheslow D, Adams W. *Wide Range Assessment of Memory and Learning 2 (WRMAL2)*. Wilmington, DE: Wide Range; 2003.
171. Gioia GA, Isquith PK, Guy SC, Kenworthy L. *Behavior Rating Inventory of Executive Function (BRIEF)*; 2000.
172. Delis DC, Kaplan E, Kramer JH. *Delis-Kaplan Executive Function System*. San Antonio, TX: Pearson, Psychological Corporation; 2001.
173. Goldberg E, Podell K, Bilder R, Jaeger J. *Executive Control Battery (ECB)*. Melbourne, Australia: Psych Press; 2000.
174. Stroop JR. Studies of interference in serial verbal reactions. *J Exp Psychol*. 1935;18:643–662.
175. Army Individual Test Battery. *Manual of directions and scoring*. *(Trail Making Test-part B)*. Washington, DC: War Department, Adjutant General's Office; 1944.
176. Grant DA, Berg EA. *Wisconsin Card Sorting Test*. Los Angeles, CA: Western Psychological Services; 1948.
177. Mischel W, Ebbesen EB, Zeiss AR. Cognitive and attentional mechanisms in delay of gratification. *J Pers Soc Psychol*. 1972;21(2): 204–218.
178. Wechsler D. *Digit Span (Forward and Reversed) Subtests of The Wechsler Intelligence Scale for Children*. 4th ed. London, United Kingdom: Pearson Assessment; 2004.
179. Kohn SE, Goodglass H, Werintraub S. *The Boston Naming Test*. Philadelphia, PA: Lea & Febiger; 1983.
180. Talley JL. *Children's Auditory Verbal Learning Test-2 (CAVLT-2)*: Odessa, FL: Psychological Assessment Resources; 1993.
181. Benton AL, Hamsher K, Sivan AB. *Multilingual Aphasia Examination (MAE)*. 3rd ed. Odessa, FL: Psychological Assessment Resources; 1994.
182. Spellacy FJ, Spreen O. A short form of the token test. *Cortex*. 1969; 5:390–397.
183. Hammill DD, Pearson NA, Voress JK. *Developmental Test of Visual Perception*. 2nd ed. Austin, TX: PRO-ED;1993.
184. Gardner MF. *Test of Visual Perceptual Skills (non-motor)*. Rev ed. San Francisco, CA: Psychological and Educational Publications; 1996.
185. Kaufman AS, Kaufman NL. *Kaufman Test of Educational Achievement*. 2nd ed. Circle Pines, MN: AGS Publishing; 2004.
186. Markwardt FC. *Peabody Individual Achievement Test*. Rev ed. Circle Pines, MN: American Guidance Service; 1989.
187. Wechsler D. *Wechsler Individual Achievement Test*. 3rd ed. San Antonio, TX: Pearson, SAGE Publications Inc; 2009.
188. Woodcock RW, McGrew KS, Mather N. *Woodcock Johnson Tests of Academic Achievement*. 3rd ed. Itasca, IL: Riverside; 2007.
189. Connolly AJ. *KeyMath-3 diagnostic assessment: Manual forms A and B*. Minneapolis, MN: Pearson; 2007.
190. Woodcock RW. *Woodcock Reading Mastery Tests*. 3rd ed. San Antonio, TX: Pearson, Psychological Corporation; 2011
191. Achenbach TM, Rescorla LA. *Manual for the ASEBA school-age forms and profiles: an integrated system of multinformant assessment*. Burlington, VT: University of Vermont, Research Center for Children, Youth and Families; 2001.
192. Reynolds CR, Kamphaus RW. *Behavior Assessment System for Children (BASC-II)*. 2nd ed. San Antonio, TX: PsychCorp; 2004.
193. Merrell KW. *School Social Behavior Scales*. 2nd ed. Eugene, OR: Assessment-Intervention Resources; 2002.
194. Harrison P, Oakland T. *Adaptive Behavior Assessment System (ABAS-II)*. 2nd ed. San Antonio, TX: Pearson, Psychological Corporation; 2003.
195. Bruininks RH, Woodcock RV, Weatherman RF, Hill BK. *Scales of Independent Behavior (SIB-R)*. Rev ed. Itasca, IL: Riverside Publishing; 1984.
196. Sparrow SS, Cicchetti DV, Balla DA. *Vineland Adaptive Behavior Scales (VABS-II)*. 2nd ed. San Antonio, TX: Pearson, Psychological Corporation; 2005.
197. Tiffin J. *Purdue Grooved Pegboard*. Chicago, IL: Research Associates; 1968.
198. Dikmen SS, Corrigan J, Levin HS, Machamer J, Stiers W, Weisskopf MG. Cognitive outcome following traumatic brain injury. *J Head Trauma Rehabil*. 2009;24(6):430–438.
199. Johansson B, Berglund P, Ronnback L. Mental fatigue and impaired information processing after mild and moderate traumatic brain injury. *Brain Inj*. 2009;23(13–14):1027–1040.
200. Himanen L, Portin R, Tenovuo O, et al. Attention and depressive symptoms in chronic phase after traumatic brain injury. *Brain Inj*. 2009;23(3):220–227.
201. Kinsella G, Prior M, Sawyer M, et al. Neuropsychological deficit and academic performance in children and adolescents following traumatic brain injury. *J Pediatr Psychol*. 1995;20:753–767.
202. Lane-Brown A, Tate R. Interventions for apathy after traumatic brain injury. *Cochrane Database Syst Rev*. 2009;(2):CD006341. http://www.thecochranelibrary.com. Accessed.
203. Feeney TJ, Ylvisaker M. Context-sensitive cognitive-behavioral supports for young children with TBI: a second replication study. *J Positive Behav Interv*. 2008;10(2):115–128.
204. Alderman N, Wood RL, Williams C. The development of the St Andrew's-Swansea Neurobehavioural Outcome Scale: validity and reliability of a new measure of neurobehavioural disability and social handicap. *Brain Inj*. 2011;25(1):83–100.
205. Tyler JS, Savage RC. Students with traumatic brain injury. In: Obiakor FE, Utley CA, Rotatori AF, eds. *Advances in Special Education: Psychology of Effective Education for Learners with Exceptionalities*. Boston, MA: JAI Press; 2003:299–323.
206. Johnstone B, Nossaman LD, Schopp LH, Holmquist L, Rupright SJ. Distribution of services and supports for people with traumatic brain injury in rural and urban Missouri. *J Rural Health*. 2002;18(1): 109–117.
207. Sample PL, Tomter H, Johns N. The left hand does not know what the right hand is doing'': rural and urban cultures of care for persons with traumatic brain injuries. *Subst Use Misuse*. 2007;42(4): 705–727.
208. Champagne JF. Decisions in sequence: how to make decisions in least restrictive environments. *EdLaw Briefing Paper*. 1993;9 & 10; 1–16.

209. Kluth P, Villa RA, Thousand JS. ''Our school doesn't offer inclusion'' and other legal blunders. *Educ Leadership*. 2002;59(4):24–27.
210. Sharp GK, Pitasky VM. *The Current Legal Status of Inclusion*. *Individuals With Disability Law Report*. Special Report No. 29, LPR Publications. 2002.
211. Cheatham GA, Hart JE, Malian I, McDonald J. Six Things to Never Say or Hear During an IEP Meeting. *Teaching Exceptional Children*. 2012;44(3):50-57.
212. Rozalski MAJ. How to determine the least restrictive environment for students with disabilities. *Exceptionality*. 2010;18(3):151–163. doi:10.1080/09362835.2010.491991.
213. Laatsch L, Harrington D, Hotz G, et al. An evidence-based review of cognitive and behavioral rehabilitation treatment studies in children with acquired brain injury. *J Head Trauma Rehabil*. 2007;22: 248–256.
214. Limond J, Leeke R. Practitioner review: cognitive rehabilitation for children with acquired brain injury. *J Child Psychol Psychiatry*. 2005; 46(4):339–352.
215. Gersten RM, White WA, Falco R, Carnine D. Teaching basic discriminations to handicapped and non-handicapped individuals through a dynamic presentation of instructional stimuli. *Anal Interv Dev Disabil*. 1982;2(4):305–317.
216. Sohlberg MM, Ehlhardt L, Kennedy M. Instructional techniques in cognitive rehabilitation: a preliminary report. *SeminSpeech Lang*. 2005;26:268–279.
217. Weeks M, Gaylord-Ross R. Task difficulty and aberrant behavior in severely handicapped students. *J Appl Behav Anal*. 1981;86(4): 449.
218. Carnine DW, Silbert J, Kameenui EJ. *Direct Instruction Reading*. 2nd ed. Columbus, Ohio: Merrill; 1990.
219. Englert CS. Effective direct instruction practices in special education settings. *Remedial Spec Educ*. 1984;5(2):38–47.
220. Kryzanowski J, Carnine DW. The effects of massed versus spaced formats in teaching sound-symbol correspondences to young children. *J Reading Behav*. 1980;12(3):225.
221. Paine SC, Carnine DW, White WA, Walters G. Effects of fading teacher presentation structure (covertization) on acquisition and maintenance or arithmetic problem-solving skills. *Educ Treat Chil*. 1982;5(2):93–107.
222. Rosenshine B, Stevens R. Teaching functions. In: Wittrock MC, ed. *Handbook of Research on Teaching*. 3rd ed. New York, NY: Macmillan; 1986:376–391.
223. Stein M, Kinder D, Silbert J, Carnine DW. *Designing Effective Mathematics Instruction: A Direct Instruction Approach*. Columbus, Ohio: Pearson-Merrill Prentice Hall; 2006.
224. Carnine DW. Effects of two teacher-presentation rates on offtask behavior, answering correctly, and participation. *J Appl Behav Anal*. 1976;9(2):199–206.
225. Carnine D. Relationships between stimulus variation and the formation of misconceptions. *J Educ Res*. 1980;74(2):106–110.
226. Gersten RM, Carnine DW, Williams PB. Measuring implementation of a structured educational model in an urban school district: an observational approach. *Educ Eval Policy Anal*. 1982;4(1):67–79.
227. Baddeley A,Wilson BA.When implicit learning fails: amnesia and the problem of error elimination. *Neuropsychologia*. 1994;32:53–68.
228. Wilson BA, Baddeley AD, Evans J, Shiel A. Errorless learning in the rehabilitation of memory-impaired people. *Neuropsychol Rehabil*. 1994;4:307–326.
229. Hawley CA. Behavior and school performance after brain injury. *Brain Inj*. 2004;18:645–659.
230. Ylvisaker M, Turkstra LS, Coelho C, et al. Behavioural interventions for Children and adults with behavior disorders after TBI: a systematic Review of the evidence. *Brain Injury*. 2007;21(8): 769–805.
231. Borkowski JG, Chan KS, Muthukrishna N. A process-oriented model of metacognition: links between motivation and executive functioning. In: Schraw G, ed. *Issues in the Measurement of Metacognition*. Lincoln, NE: University of Nebraska Press; 2000:1–41.
232. Robinson TR, Smith SW, Miller MD, Brownell MT. Cognitive behavior modification of hyperactivity impulsivity and aggression: a meta-analysis of school-based studies. *Educ Psychol*. 1999:91: 195–203.
233. Carr EG, Homer RH, Turnbull AP, et al. *Positive Behavior Support for People with Developmental Disabilities: A Research Synthesis*. Washington, DC: American Association of Mental Retardation; 1999.
234. Feeney TJ, Ylvisaker M. Choice and routine: antecedent behavioral interventions for adolescents with severe traumatic brain injury. *J Head Trauma Rehabil*. 1995;10(3):67–86.
235. Forest M, Lusthaus E. Promoting educational equality for all students: circles and maps. In: Stainback S, Stainback W, Forest M, eds. *Educating all Students in the Mainstream of Regular Education*. Baltimore, MD: Paul H. Brookes Publishing; 1989.
236. Glang A, Singer GHS, Todis B, eds. *Students With Acquired Brain Injury: The School's Response*. Baltimore, MD: Paul H Brookes; 1996.
237. Rehabilitation Act, 29 USC §794 (1973).
238. United States Department of Health and Human Services/Office for Civil Rights. USDHHS Web site. http://www.hhs.gov/ocr/civilrights/resources/laws/index.html. Accessed July 20, 2011. AQ5
239. Savage RC. The great leap forward: transitioning into the adult world. *Preventing School Failure*. 2005;49(4):43–52.
240. National Secondary Training and Technical Assistance Center (NSTTAC). Evidence-based secondary transition practices. NSTTAC Web site. http://www.nsttac.org/ebp/evidence_based_practices.aspx.Accessed August 1, 2011. AQ5
241. Farmer JE, Johnson-Gerard M. Misconceptions about traumatic brain injury among educators and rehabilitation staff: a comparative study. *Rehabil Psychol*. 1997;42(4):273–286.
242. Funk P, Bryde S, Doelling J, Hough D. Serving students with traumatic brain injury: a study of educators' knowledge level and personnel preparation needs in Missouri. *Physical Disabilities: Education and Related Services*. 1996;15:49–64.
243. Tyler J. Preparing educators to serve children with ABI. In: Glang A, Singer G, Todis B, eds. *Students with Acquired Brain Injury: The school's response*. Baltimore, MD: Paul H. Brookes Publishing. 1997: 323–341.
244. Blosser JL, DePompei R. Preparing education professionals for meeting the needs of students with traumatic brain injury. *J Head Trauma Rehabil*. 1991;6(1):73–82.
245. Turnbull HR, Turnbull AP, Shank M, Smith S. *Exceptional Lives: Special Education in Today's Schools*. 4th ed. Upper Saddle River, NJ: Merrill-Prentice Hall; 2004.
246. Borko H. Professional development and teacher learning: mapping the terrain. *Educ Res*. 2004;33(8):3–15.
247. Darling-Hammond L, Richardson N. Teacher learning: what matters? *Educ Leadersh*. 2009;66(5):46–53.
248. Grossman P, Wineburg S, Woolworth S. Toward a theory of teacher community. *Teach Coll Rec*. 2001;103(6):942.
249. Little JW. Locating learning in teachers' communities of practice: opening up problems of analysis in records of everyday work. *Teach Teach Educ*. 2002;18(8):917.
250. Yoon KS, Duncan T, Lee SW-Y, Scarloss B, Shapley KL. *Reviewing the Evidence on How Teacher Professional Development Affects Student Achievement* (Issues & Answers. REL 2007-No. 033). Washington, DC: US Department of Southwest; 2007. http://ies.ed.gov/ncee/edlabs. Accessed. AQ5 AQ6
251. Fixsen DL, Naoom SF, Blase KA, Friedman RM, Wallace F. *Implementation Research: A Synthesis of the Literature*. Tampa, FL: University of South Florida, Louis de la Parte Florida Mental Health Institute, The National Implementation Research Network; 2005.

252. Jones HA, Chronis-Tuscano A. Efficacy of teacher in-service training for attention-deficit/hyperactivity disorder. *Psychol Sch*. 2008; 45(10):918–929.
253. Lerman DC, Tetreault A, Hovanetz A, Strobel M, Garro J. Further evaluation of a brief, intensive teacher-training model. *J Appl Behav Anal*. 2008;41(2):243–248.
254. Bowen JM. Classroom interventions for students with traumatic brain injuries. *Preventing School Failure*. 2005;49(4):34–41.
255. Fuchs LS, Fuchs D. Effects of expert system consultation within curriculum-based measurement, using a reading maze. *Except Child*. 1992;58(5):436–450.
256. Gersten R, Chard DJ, Jayanthi M, Baker SK, Morphy P, Flojo J. Mathematics instruction for students with learning disabilities: a meta-analysis of instructional components. *Rev Educ Res*. 2009; 79(3):1202–1242.
257. Sailors M, Price LR. Professional development that supports the teaching of cognitive reading strategy instruction. *Elem Sch J*. 2010; 110(3):301–322.
258. Benedict E, Horner R, Squires J. Assessment and implementation of behavior support in preschools. *Topics Early Child Spec Educ*. 2007;27(3):174–192.
259. Noell GH, Witt JC, Gilbertson DN, Ranier DD, Freeland JT. Increasing teacher intervention implementation in general education settings through consultation and performance feedback. *Sch Psychol Q*. 1997;12(1):77–88.
260. Davis AS. Review of brainSTARS—brain injury: strategies for teams and reeducation for students. *J Sch Psychol*. 2004;42(1):87–92.
261. Dise-Lewis JE, CalveryME, LewisHC. *BrainSTARS:Brain Injury – Strategies for Team and Re-education for Students*. Wake Forest, NC: Lash and Associates Publishing and Educational Services; 2006.
262. Dise-Lewis JE, Lewis HC, Reichardt CS. BrainSTARS: pilot data on a team-based intervention program for students who have acquired brain injury. *J Head Trauma Rehabil*. 2009;24(3):166–177.
263. Carpenter TP, Fennema E, Peterson PL, Chiang C-P, Loef M. Using knowledge of children's mathematics thinking in classroom teaching: an experimental study. *Am Educ Res J*. 1989;26(4):499–531.
264. McCutchen D, Abbott RD, Green LB, et al. Beginning literacy: links among teacher knowledge, teacher practice, and student learning. *J Learn Disabil*. 2002;35(1):69.
265. Odom SL. The tie that binds: evidence-based practice, implementation science, and outcomes for children. *Topics Early Child Spec Educ*. 2009;29(1):53–61.

AUTHOR QUERIES

AQ1: Please verify assigned level of heads.

AQ2: Please spell out abbreviation on first mention.

AQ3: Please supply complete reference information for this citation in text.

AQ4: Please confirm if edit made is acceptable.

AQ5: Please confirm if edit made to reference is acceptable.

AQ6: Please indicate the date of access.

AQ7: Please supply complete information for this reference entry.