We describe in this article the origins and rationale of a decade-long program to enhance the expertise of school psychologists and other special educators in the domain of traumatic brain injury (TBI). After consultation with representatives of public and private rehabilitation hospitals, schools and professional organizations, the North Carolina State Department of Public Instruction (DPI) began a systematic effort to acquaint relevant school personnel with the various nuances of traumatic brain injury in children and adolescents. Emphasis was on training school psychologists, but efforts also were directed at the use of advanced assessment strategies and evidenced-based treatments. This article reviews both the program’s successes to date—its positive impact on school psychologists’ work with brain-injured students—and the possibilities for future modifications of the model to make it even better.

Implementing TBI Legislation

Each year, an estimated 75–200 of every 100,000 children in the United States sustain a TBI.1,2 Given that 75%–80% of all head injuries are mild in nature3,4 and thus may go unreported, the figure is likely to be much larger. In any case, the result is that TBI represents a major educational problem for school-age children and adolescents. Until legislation was introduced in the early 1990s, brain-injured children were usually not identified as needing special educational services, although some school systems accommodated such students by classifying them as Learning Disabled, Mental Retarded, or Multiply Handicapped. In October 1990, Public Law 101-476, the Individuals with Disabilities Education Act (formerly known as the Education of the Handicapped Act), modified the definition of “children with disabilities” to make children with TBI eligible for special education services. In 1990, the DPI formed a Task Force to assess special education placement of school-age children and adolescents surviving TBI. Implementing the new federal legislation in the state of North Carolina required several important steps.

Step 1: Establishing a State Definition. The first activity of the task force was to adopt a workable definition of TBI, a definition that would satisfy federal standards but also address North Carolina’s needs. At that time, a proposed federal definition was much more inclusive, and lumped together TBI caused by external physical forces (like a car accident) with internal events (like stroke); the final federal definition limited TBI to external force injuries only. The current state definition reads as follows:

Traumatic brain injury means an acquired open or closed head injury caused by an external physical force that impairs a student’s cognitive, communicative, perceptual, behavioral, social-emotional, and/or physical abilities to the extent that the student requires special education. Congenital, degenerative, or brain injuries induced by birth trauma are not included in this definition5,6

Despite the more restrictive nature of this definition, the task force felt strongly that students with all forms of brain injury should be eligible for special educational services. Brain injury rehabilitation specialists have long recognized that brain-injured persons have common characteristics and rehabilitative needs, and that intervention may be helpful, regardless of the disability category. The North Carolina evaluation procedures

**Training School Psychologists in Traumatic Brain Injury**

The North Carolina Model

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address this concern. A note at the bottom of the TBI section of the placement guidelines reads as follows:

**NOTE:** Those students with non-traumatic brain injury (e.g., tumor, vascular/circulatory disorders, degenerative diseases, etc.) should be considered for assessment as outlined above.5,6

**Step 2: Establishing Special Education Placement Guidelines.** With a working definition of TBI in hand, the task force developed a draft of placement guidelines. The draft recommendations were sent to school professionals involved in services for exceptional children, and their comments were incorporated in succeeding drafts. Experts interested in TBI, particularly school psychologists (who work with these children) and pediatric neuropsychologists (who know about brain-behavior relationships and disorders of brain function), were asked to evaluate the proposed placement guidelines. A pediatric focus was important, given the educational issues related to learning, school entry, and general school function encountered by so many TBI survivors.

The inclusion of neuropsychologists meant that North Carolina, unlike nearly all other states, developed two ways for students to be identified as having suffered TBI. One way, which most states have adopted, is medical documentation that a TBI has occurred. This is the usual pathway of entry to services for children who have sustained a moderate to severe injury. But most TBIs are relatively mild in nature, and undocumented mild injuries can still disrupt school functioning. In fact, even mild injuries, if they occur in mid- to late spring, especially in schools that use a year-round curriculum, can disrupt two years of school. So, by allowing comprehensive neuropsychological evaluation to define the cognitive residuals of TBI, North Carolina provided a second way to identify students in need of special education services. Having two portals of entry to services makes it possible to ascertain the full range of injuries and to assess the special education services needed.

**Step 3: A School-Based Implementation Model.** Once guidelines were completed and approved by the North Carolina State Board of Education, systems and procedures were developed to help schools implement these new guidelines. There were several potential ways to carry out implementation: (1) by using outside clinicians (physicians and neuropsychologists); (2) by sending referred students to centralized assessment centers (as is done with low-incidence handicapping conditions like autism); and (3) by using school-based psychologists. A number of factors led to the selection of school psychologists. The costs of using outside clinicians were prohibitive (a typical neuropsychological evaluation costs $1,000 or more), so only the most affluent school systems could afford more than one or two evaluations per year. Secondly, it was felt that if school psychologists were involved in the assessment and tracking procedures, they would be in the best position to follow up on students with TBI—perhaps acting as case managers and coordinating the various school services. Finally, since they know the school environment, they can more efficiently and effectively carry out the arranging of services.

However, most school psychologists have had no training in neuropsychology, TBI, or other neurological disorders, meaning they would need additional (and immediate) training in the assessment and structuring of programs for students with TBI.5 A benefit of the additional training is that it would create a cadre of knowledgeable, school-based professionals who could help children with brain injury. This would be particularly advantageous in rural and semi-rural counties where such expertise is less available. To date, North Carolina is the only state to carry out an extensive training program for school psychologists.

**Step 4: The Training Model.** The task force established a set of core competencies in the area of TBI to be addressed in developing training programs to improve the knowledge base, assessment skills, and intervention functions of school psychologists and related school-based personnel. It was decided to provide training in two parts. The first part would consist of a series of didactic workshops, and the second would use clinical case supervision to ensure competency in working with these children.

The state DPI inserted some “teeth” into the training procedures. A Registry of Approved Providers was created so the Department could identify who was trained and had met the core competencies outlined above. To be enrolled in the Registry, school psychologists have to complete both parts of the prescribed training. School systems that allow school psychologists who are not on the Registry of Approved Providers to work with students with brain injury risk losing state funds for that student.

To ensure competent case supervision during training, prospective supervisors were screened by a state DPI-TBI Subcommittee. Those whose credentials met professional standards for neuropsychology6 were placed on a list of “Approved Supervisors.” School psychologists must be supervised in their training by an individual on this list.

Finally, it is worth noting the care that was taken to avoid even the appearance that completing the training program produced a “neuropsychologist.” The training program was meant only to be an introduction to the subject matter of TBI. This concern is apparent in the guidelines’ description of evaluation not as a “neuropsychological assessment,” but rather as “a psychological evaluation for traumatic brain injury.”4,5

Officials from the licensing board for psychology were included in the development of the training procedures to avoid any violation of state licensing laws for psychologists.

**The Training Curriculum**

The training curriculum was developed to help school psychologists become competent to work with students who had suffered a TBI. Given their relative lack of training in this domain (and
in brain-behavior relationships in general), a detailed overview was deemed necessary to provide a basic understanding of the incidence and causes of TBI, the basic mechanisms involved in a brain injury and—most importantly—the effects of TBI on school performance.

Once school psychologists have this basic information, they need to learn new ways to carry out psychological assessment of these students. For example, the usual battery of psychoeducational tests does not evaluate areas of impairment that are critical for TBI survivors (like disorders of attention, memory, or executive function). The evaluation process would need to address these components. School psychologists were urged to move from a “test-driven” approach to assessment to a “construct-driven” approach.

Previously, school psychologists and other educators rarely knew what to expect from students after a TBI, much less how to intervene with their problems. School psychologists who were going to be the main force in the assessment process needed to learn new ways to intervene with TBI students. The linkage of assessment to treatment became a critical part of the special education services provided. The Table shows the areas of competency needed, the training objectives, and the specific training processes used.

To achieve core competencies and training objectives, the task force developed an extensive training program, which has two major components. The first component consists of three didactic workshops comprising about 42 hours of instruction (approximately the duration of a graduate level course). The first, three-day workshop introduces participants to basic epidemiological data such as incidence and prevalence of TBI; causes and mechanisms of TBI; medical, cognitive, and social-emotional outcomes of TBI; basic elements of neuroanatomy; and brain-behavior relationships. It provides initial exposure to neuropsychological techniques and instruments used to assess TBI, and to program alternatives like school re-entry for brain-injured students. The second, two-day workshop on advanced assessment strategies and techniques provides detailed information about a construct-based approach to assessment. The quantitative and qualitative assessment strategies introduce a number of tests that have been largely unfamiliar to school psychologists. There is specific information on neurocognitive functions (motor, sensory, attention, language, visual processing, memory, and executive functions), and specific strategies for assessing them. The third, two-day workshop uses case-study scenarios of various kinds of TBI to teach specific intervention approaches and techniques on the following topics: the importance of linking assessment to treatment in working with brain-injured students; hospital/school liaisons; school re-entry issues; and the use of case monitoring strategies to follow the student through the recovery process. Much of this didactic material has been summarized in a “best practices” manual produced by DPI.

After their didactic training experiences, participants begin the second major component of their training. This involves 30 hours of case supervision under the guidance of an approved supervising neuropsychologist. The supervision, either in an individual or group format, typically involves discussion of specific TBI cases that covered a full range of topics from pre-assessment data collection, through the nature of a particular TBI and associated prognosis/recovery issues, through assessment strategies in the school setting and school-based interventions, to monitoring of progress. Case supervision adds a clearly practical component to the training, and, at its best, uses active cases from within a school psychologist’s own school system.

After completing all phases of the training, school psychologists are listed by the DPI Registry as Approved Providers of services to students with TBI. The listing acknowledges their training and allows them to work directly in the evaluation, consultation, and school programming of students with TBI.

**Evaluation of the Training Initiative**

One of the DPI’s major goals was to improve the training of school psychologists in the area of TBI. Participants have been unequivocally positive in their evaluation of the workshops and supervision groups, and have clearly articulated the need for such training. In fact, many have requested refresher workshops to continue their leaning in this domain.

To date, 557 (83%) of North Carolina’s 675 school psychologists have completed at least part of the training required by the Registry of Approved Providers; about 200 (nearly 30% of the total workforce) are currently listed in the Registry of Approved Providers. There was a concern about whether this training would reach all 117 school systems in the state. For example, would urban areas be more likely to train and retain school psychologists and rural areas less likely? The numbers are a bit elusive because school psychologists move in and out of state, change jobs within their systems, and retire; but it is estimated that one or more persons have completed some or all of the training in at least 80% of systems that employ school psychologists. School systems in the eastern part of the state, particularly the northeast, may have the fewest number of persons trained. However, only about 13 Registry-approved supervisors represent both urban and rural areas. Given the relative dearth of pediatric neuropsychologists, the uneven distribution of these professionals across the state remains one of the key areas of need.

**Future Considerations**

To our knowledge, North Carolina’s DPI is the only state department in the country that has attempted to train school psychologists in the area of TBI. To date, the program has been quite successful in overcoming the relative lack of training of school psychologists regarding the unique but dynamic needs of students who have suffered a traumatic brain injury. Now,
Table. Core competencies, training objectives, and training mechanisms used by the North Carolina Department of Public Instruction to teach school psychologists about TBI

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<tr>
<th>Core Competencies</th>
<th>Training objectives</th>
<th>Training mechanism</th>
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<tr>
<td>Increase the knowledge base of school psychology workforce and other special educators in the area of TBI.</td>
<td>- Increased understanding of Brain-based relationships; Epidemiology of TBI; TBI causes and mechanisms; Medical, cognitive, educational, and social-emotional issues and outcomes following a TBI; The TBI recovery process; Assessment and treatment needs of this population.</td>
<td>Workshop 1 Workshop 2 Workshop 3 Case Supervision</td>
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<tr>
<td>Increase the skills of school psychologists in psychological assessment of students with TBI.</td>
<td>- Increased range of skills in assessing of students following a TBI. - Increased understanding of a neurocognitive construct-driven approach to assessment. - Increased utilization of traditional psychoeducational procedures in the assessment of students following a TBI.</td>
<td>Workshop 1 Workshop 2 Case Supervision</td>
</tr>
<tr>
<td>Increase the intervention skills of school psychologists for students with TBI.</td>
<td>- Increased understanding of the various approaches to intervention and rehabilitation in TBI. - Increased range of intervention skills for students with different TBI severity. - Increased consultation skills in working with teachers in the treatment of students following a TBI. - Improved tracking and monitoring of students following a TBI.</td>
<td>Workshop 1 Workshop 3 Case Supervision</td>
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after having completed a decade of training, we must consider five issues for the future.

(1) It is important that training be conducted on a systematic basis and linked tightly to other state initiatives aimed at training personnel throughout the state. This could be cost-effective, and remove a fiscal burden from DPI. A systematic, state-based training model would facilitate educating the entire state workforce, but will require increased collaboration across departments and divisions in the state. In addition to training professionals from various state agencies, such collaboration undoubtedly would increase knowledge about and the cataloging of state and regional resources for TBI survivors and their families.

(2) Over the past 10 years we have been relatively successful in achieving the original goals of the DPI, but our understanding of and knowledge about TBI is changing rapidly. It is important that updated information be regularly communicated to school psychologists and other professionals who work with persons suffering TBI. One mechanism would be regular (annual or bi-annual) “booster sessions” to discuss current advances in this field and bring school psychologists and other school personnel abreast of current literature on TBI, particularly as it applies to school functioning. In addition to providing current information, these booster sessions could emphasize school transitions; help link students to other, community-based providers outside the school; and increase the focus on families and the coordination of services.

(3) Most of the costs for the didactic and supervisory components of training have been borne by DPI, individual school systems, and participants. The training program was developed along the lines of a semester graduate course in hopes that the model would be adopted by School Psychology Training Programs. This has not yet occurred. These programs already have full course loads, but elective classes could be established—or core courses modified—to cover TBI-related materials derived from the state-based curriculum. There are beginning efforts to address some of these training needs, but we need more discussion to determine what hinders the inclusion of all or part of this material in school psychology training programs.

(4) Psychologists in school systems across North Carolina have acquired an impressive degree of training, but concerns remain that resource-poor and rural school systems are likely not to have a Registry-approved school psychologist on staff. Spe-
cific efforts should be aimed at getting training and expertise to these systems. For instance, the state might subsidize and target training initiatives to specific school systems, although that would not necessarily prevent school psychologists from moving out of the district. It may be that the school-based model is not the most appropriate or most cost-effective model for providing service in certain districts. We need to re-examine and possibly modify the training model to meet the needs of particular school systems. One by-product of the present training model has been the sharing of tests and procedures across school system lines. Perhaps a similar arrangement could allow neighboring school systems to provide assessment and consultation services by a TBI-trained school psychologist to systems without such services. Another model might use state-based Autism Centers as resources of trained school psychologists to provide for the TBI needs of a region—including school systems without a trained individual on staff. There are other ways to address our needs, and additional discussions should be helpful in sorting out what to do.

(5) Given the importance of getting trained personnel involved with students who have suffered a TBI, it might be advantageous to extend the training model to establish school-based teams to deal with all neurologically impaired students. Because of the relatively low prevalence of TBI, such teams could focus on pediatric neurologic disorders in general—strokes, seizures, tumors—and include TBI. This would justify the creation of teams separate from the school-based teams that already deal with special education needs of students. These teams should be interdisciplinary in nature and, by design, could facilitate case-finding efforts, school transitions, assessment, intervention, and tracking for students with neurological problems. A team of school-based experts could facilitate community liaison with other health-care providers and hasten the delivery of special education services when necessary.

The training program described here has been innovative in its development and noteworthy in its execution. It undoubtedly has improved school-based services available to students who have survived a TBI. Linkages to other state-based training initiatives and modifications in the current curriculum will continue to propel the program forward and impact positively on professionals who work with children with brain injury. Our schools have many persisting needs, but it is important to note that our school psychology work force today is one of the country’s most knowledgeable and best trained in the area of TBI. This can only contribute to improving the services we provide to students who sustain a TBI.

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