TRAUMATIC BRAIN INJURY IN K-12 STUDENTS: WHERE HAVE ALL THE CHILDREN GONE?

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When children who are permanently disabled by traumatic brain injury (TBI) return to school, most are placed in mainstream classrooms and incorrectly presumed capable of resuming their education. Only one to two percent are classified as students with TBI, qualifying them for the services they need for their education. The failure to properly classify so many children, attributed to a lack of training and to acceptance of inaccurate popular stereotypes, places 98 to 99 percent at risk of academic failure and personal maladjustment. The failure to identify these children needs to be addressed by TBI education and training for parents and professionals. This paper discusses the scope of the problem of improperly classified students, examines explanations for the pervasive failure to classify them accurately, and discusses potential solutions.

It is imperative to identify students who have sustained severe traumatic brain injury (TBI) (Slomine et al., 2006). The damage to learning, information processing, and self-management systems is permanent (Bigler, 2007; McCullagh & Feinstein, 2005), leaving the students unable to learn, adapt, and develop normally through ordinary education (Chapman, 2007). In recognition of this fact, the 1990 Individuals With Disabilities Education Act or IDEA (PL101-476) required schools to identify them and to provide special education services appropriate for TBI. The Congress assumed that these provisions would be sufficient, but they did not take account of how readily cases of severe injury are overlooked (Halligan & Wade, 2005), most notably by educators who lack special training in TBI (DePompei & Bedell, 2008).

The most extreme head injuries cause massive brain damage and obvious impairments of speech, intelligence, and basic physical abilities. These children are readily identified by school systems and routinely placed in special education programs (Gronwall, Wrightson, & Waddell, 1999). With these cases in mind, educators generally assume that TBI is a low-incidence disability, but this belief is incorrect (Hooper, 2006; Tyler, 2000). Most of the children with severe TBI have less obvious deficits, and their relatively normal appearance gives parents and teachers the false impression that the injury is healed and the child will be able to function normally in mainstream classrooms (Max, 2005). The failure to recognize their hidden disablement creates *an enormous gap between the incidence of children with TBI reported by hospitals to the CDC and the numbers of students with TBI identified by schools for special education* (Working Group of the Moody Conference on Children and Youth With Brain Injuries, reported in DePompei & Bedell, 2008).

The failure to promptly identify students with TBI has important implications. They can be expected to fall progressively farther behind their peers in learning and academic achievement until they reach the failure level, where they can be expected to stay for the remainder of their educational careers (Taylor et al., 2003). When their academic problems become more obvious at a later point, many are misclassified with a different exceptionality (such as learning disability or emotional disturbance) and

provided with a curriculum that does not address their educational disabilities (Glang, McLaughlin, & Schroeder, 2007) or their abnormal social skill development (Chapman, 2007; Max, 2005). Unless they are identified and given the appropriate services, *their eventual functioning as adults is being jeopardized* (Lehr & Savage, 1990, p. 309).

The Prevalence of Disabling TBI

The annual incidence of TBI among school-aged children is estimated at 2.5 million (Dettmer, Daunhauer, & Detmar-Hanna, 2007). Most of these children are mildly injured and do not receive hospital care. The Centers for Disease Control report emergency room visits for TBI for more than 400,000 children below the age of 15, approximately 1.2% of the population (Langlois, Rutland-Brown, & Thomas, 2004, 2005).

Epidemiological studies do not assess the population-wide prevalence of TBI directly, but rather derive the prevalence from the incidence statistics or extrapolate from small-sample studies (Kraus & Chu, 2005). For example, Kingston's (1985) finding that about 10% of hospitalized TBI cases remain disabled was employed to estimate the prevalence of disability in school-aged children at above 3% (Mira, Tucker, & Tyler, 1992). A slightly lower estimate of 2.5% was offered by Savage and Wolcott (1994). Rivara and Muller (1986) estimated prevalence at 3% in the range from kindergarten to age 16 (Deaton, 1990). The last estimate excludes two to three years from the age range of highest frequency (15-24), gauged at 1 in 181 or 0.55% per year (Kraus, Fife, Cox, Ramstein, & Conroy, 1986). Adjusting for the missing years, the K-12 prevalence is estimated by this study to fall in the range from 4.1 to 4.7%. In practical terms, these prevalence estimates mean that as few as one K-12 student in 40 or as many as one in 20 are disabled by TBI.

These prevalence estimates are largely consistent with other epidemiological studies. A comprehensive study of a Swedish village found 5% of the children aged seven through 16 years with a history of TBI with coma and neurobehavioral symptoms of concern to their parents (Levin, Benton, & Grossman, 1982). A study in Finland estimated the prevalence of TBI cases hospitalized for at least 24 hours at 21% (Winqvist, Lehtilahti, Jokelainen, Luukinen, & Hillbom, 2007). In the United States, the K-12 prevalence of TBI cases requiring medical care is reported at 10% (Lehr & Savage, 1990). The prevalence of injury producing coma is reported at 10.5% for girls and 18.1% for boys (Segalowitz & Brown, 1991). The prevalence of coma-producing injury found among post-secondary student samples ranged from 13 to 24% (Crovits, Horn, & Daniel, 1983; McGuire, Burright, Williams, & Donovick, 1998; Rivers, Schutz, & Lobato, 2007; Triplett, Hill, Freeman, Rajan, & Templer, 1996).

The Need for Special Education Services

Two alternative approaches have been used to determine educational disablement (Dettmer et al., 2007). The first approach is diagnostic. The long-term cognitive, behavioral, and functional consequences of TBI can be determined by a single variable: *There is a direct relationship between injury severity and cognitive deficits* (Lehr, 1990, p. 99), and *severity is the overriding predictor of…recovery* (Ewing-Cobbs & Fletcher, 1990, p. 121). Severity is determined by the amount of force that was applied to the brain, and the resulting number of individual brain cells that were killed (Gronwall et al., 1999). The most widely used severity measure is coma duration, with coma that persists until the admission medical exam classified as severe TBI (Ewing-Cobbs & Fletcher, 1990; Williams, Levin, & Eisenberg, 1990). A large body of research verifies the relationship of coma duration with all aspects of educational disablement (Corbett & Ross-Thomson, 1996; Jaffe, Polissar, Fay, & Liao, 1995; McDonald et al., 1994). Severe injury produces permanent deficits in learning new information and performing the *executive* skills of problem solving, self-organization, and the integration of new abilities, severely restricting further academic achievement through regular or traditional special education (Ewing-Cobbs et al., 1998a; Savage & Woolcott, 1995; Schutz & Schutz, 2004). Some of these children have stopped learning and developing altogether (Chapman, 2007). Thus, long-term educational disablement can be determined at the time of school re-entry by reference to the coma duration.

If needed, sensitive diagnostic neuropsychological tests can be administered to verify the learning and executive impairments of severe injury (Ewing-Cobbs et al., 1998b). For example, in Minnesota students qualify for special education by documenting any *impairment that adversely affects the child's educational performance* (Minnesota Department of Education, 2006, p. 2). This diagnostic approach is proactive, allowing schools to provide early intervention (Deidrick & Farmer, 2005). *It is important from both clinical and public health perspectives that children and adolescents at risk…be identified*

and treated early following injury (Max et al., 1998, p. 290). The alternative of *unclassified or missed TBI often leads to school failure/dropout, conflict between parents and the school and the student becoming demoralized* (Hibbard, Gordon, Martin, Raskin, & Brown, 2001, p.4).

The second model is descriptive, recognizing disability only when academic performance has become abnormal. For example, in 2006 only students performing *significantly* below grade level were classified as in need of special education in Florida, based on a discrepancy of at least one standard deviation for ages seven to 10 and at least one and one-half standard deviations for ages 11 and above (Florida Department of Education, 2006). Whereas physical or sensory disabilities produce descriptive disablement at the same time that they produce diagnostic disablement, the same is not true for the cognitive symptoms of TBI (Sohlberg & Mateer, 2001). At school re-entry, most children with severe TBI can perform at or near their prior academic levels because they retain their pre-injury knowledge and skills (Hibbard et al., 2001; Walker & Wicks, 2005). On this basis, most earn normal scores on achievement tests, at least in their first year back in school (Deidrick & Farmer, 2005; Ylvisaker & Gioia, 1998). Because their physical abilities, conversational speech, and knowledge appear normal, they do not fit the traditional classroom profile of the academically disabled child, so most school systems accept mainstream placement as appropriate (Slomine et al., 2006; Walker, 1997).

Children who functioned above average before injury take even longer to fall significantly below grade level. Moreover, the rate of decline can be slowed by special resources (e.g., good work habits, the support of a cohesive family, accommodations or extra help from teachers) and protection from major burdens (e.g., a stressful environment, child/family psychopathology, financial hardships, excessively demanding curricula) (Bloom et al., 2001; Hux, Bond, Skinner, Belau, & Sanger, 1998; Max et al., 1999; Sesma, Slomine, Ding, & McCarthy, 2008; Taylor et al., 2002). In addition, some courses of study allow students to function in the normal range for up to two years by drawing on pre-injury knowledge (Savage & Wolcott, 1995). For example, students injured in high school may be advised to meet graduation requirements by taking low-demand electives (Blosser & DePompei, 2003). However, those who remain in the educational system long enough eventually face demands they cannot meet even with the best resources and protection, at which time their achievement levels drop into the abnormal range (Ewing-Cobbs et al., 1998a; Savage, DePompei, Tyler & Lash, 2005).

By the second or third year post onset, most students with severe TBI show declining grades, teacher ratings, and national test scores in reading/language arts, spelling, and math, and report more frustration and personal failure (Anderson, 2003; Ewing-Cobbs et al., 2004; Fay et al., 1994; Greenspan & MacKenzie, 1994). By this time, this group also shows elevated rates of behavior problems (Bloom et al., 2001; Max et al., 2000), which increase in later years (Begali, 1992) and remain *discouragingly persistent* (Schwartz et al., 2003, p. 259).

An Australian study found 70% of students in coma at hospital admission placed in special education programs at two years post onset while 40% of those in a state of confusion at admission received special education (Kinsella et al., 1997). An American study found 79% of children comatose at admission to be disabled at two years post onset (Ewing-Cobbs et al., 1998a), with 69% still demonstrating disablement two years later (Taylor et al., 2003). A British study found 79% of children in coma for six hours or longer and 62% of those in coma between 15 minutes and six hours to be academically disabled (Hawley, 2004). Several American studies found coma duration exceeding 24 hours to be associated with universal, immediate, persistent disablement (Klonoff, Clark, & Klonoff, 1993; Lehr & Savage, 1990; Levin & Eisenberg, 1979).

Once children begin falling behind their peers, the disablement appears to continue indefinitely (Taylor et al., 2003). Jaffe and associates (1995) found no evidence of academic recovery at three years post onset. Taylor and associates verified the absence of recovery at four years and concluded *post-injury behavior and scholastic problems fail to resolve over time* (Taylor et al., 2002, p. 15). Less than one percent of the students classified as educationally disabled by TBI have returned to full mainstream status (U.S. Department of Education, 2007). One study found 73% of children in coma at admission and 86% in a coma for at least one day to be academically disabled at five to seven years post onset (Massagli, Michaud, & Rivara, 1996).

In adolescence, the progression of disability accelerates. The executive functions of a damaged brain fail to assume cognitive control of behavior in the way they do in the maturing, intact brain (Oddy, 1993; Sohlberg & Mateer, 2001), causing TBI's most prominent impairment (Stuss & Gow, 1992): an

incapacity to meet the age-appropriate expectations for self-control and self-management (Arroyos-Jurado, Paulsen, Ehly, & Max, 2006; Dawson & Guare, 2004).

The outcome studies reviewed in this section verify special needs for children who sustained severe TBI, and indicate that children who sustained any traumatic coma are at risk for disablement. These two groups, estimated above to represent at least 10% of the K-12 population, should be classified and receive specialized management or close monitoring.

Progress in Identifying Children with TBI

The American educational system has failed to implement the provisions of PL 101-476 (Glang, Tyler, Pearson, Todis, & Morvani, 2004; Tatzmann, Clancy, & Reagan, 2006; Ylvisaker et al., 2001). The U. S. Department of Education identified fewer than 12,000 students (.02% of the students enrolled in kindergarten through grade 12) in the TBI category in 1997-1998 (Ylvisaker et al., 2001). To determine subsequent progress, the present authors reviewed the most recent annual records posted by each state. Thirty-eight states reported statistics for 2004 or later, which are summarized in Table 1.

Table 1

Proportion of Students Receiving ESE Services for TBI by State

Percentage of:	All ESE	All Students
State		
Alabama	.31	.04
Alaska	.36	.05
Arizona	.35	.04
California	.23	.03
Colorado	.30	.03
Connecticut	.18	.02
Delaware	.20	.03
Florida	.16	.02
Idaho	.51	.06
Illinois	.27	.04
Indiana	.25	.06
Kentucky	.26	.03
Louisiana	.31	.04
Maine	.27	.05
Massachusetts	3.18	.59
Michigan	.26	.04
Minnesota	.39	.05
Mississippi	.26	.03
Missouri	.36	.05
Montana	.43	.05
Nevada	.45	.05
New Hampshire	.15	.02
New Jersey	.65	.10
New Mexico	.46	.07
New York	.29	.04
North Carolina	.27	.04
North Dakota	.36	.04
Ohio	.44	.07
Oregon	.37	.04
Pennsylvania	.30	.02
South Dakota	.39	.06
Tennessee	.20	.03
Texas	.30	.04
Utah		.05
Vermont	.42	.06
Washington	.30	.04
Wisconsin	.32	.04
Wyoming	.62	.09

These data are confirmed by national statistics, showing that the total number identified in 2004 was 23,000 (Dettmer et al., 2007). The percentage of students has always been less than .05%, including the

latest year reported (2005-2006) (U. S. Department of Education, 2007). Interestingly, there is considerable variation across states, with the most successful state, Massachusetts, serving more than twenty-five times the proportion classified in the least successful states, Connecticut, Florida, New Hampshire, and Pennsylvania. The classification rate remains at the overall 1997-1998 level of .02% only in these four states. A comparison of these classification rates with the prevalence figures in the previous section discloses that approximately 98 to 99% of the disabled children are not appropriately identified.

Barriers to Identifying Children with TBI

The available evidence indicates that the parents, teachers, and doctors responsible for these unidentified children do not recognize the relationship between their delayed-onset academic problems and their history of brain injury (Sesma et al., 2008; Tatzmann et al., 2006). Because this failure to perceive the logical relationship between brain damage and scholastic difficulty is so nearly universal, it may be best explained as a stereotype error, *a consequence of the mismatch between a non-brain-injured person's mental representation of what brain injury is, and the actual facts* (Swift & Wilson, 2001, p. 159).

There are five ways in which the brain-damaged stereotype differs from the actual behavior of children with TBI. The first is the belief that serious brain damage produces disabilities so tangibly manifested in behavior that they should be noticeable, whereas most TBI symptoms are essentially *silent* (Gordon et al., 1998). One survey of the general public found 36% believing it would be *easy* to recognize a person with TBI by simple observation (Guilmette & Paglia, 2004). The second is the expectation that brain damage should prevent performing normal tasks, whereas TBI mainly produces more subtle, situational, quantitative flaws (Lash, 1995). The third is the expectation that brain damage causes physical disability, whereas most children *look fine* physically (Dise-Lewis, Glang, & Tyler, 2006, p. 90). The fourth is the expectation that behavioral symptoms should have a bizarre quality like those in mental illness (Rosen & Gerring, 1986), whereas the actual symptoms are largely indistinguishable from problems of personality (Goldberg, 2001), motivation (Swift & Wilson, 2001), or character (Tatzmann et al., 2006). The fifth is the expectation that significant TBI should make children stupid, whereas their reasonably fluent speech and preserved pre-injury knowledge base maintain an impression of intellectual intactness (Schutz & Schutz, 2004). Some people hold an even stronger version of this stereotype: 31% of a general public sample agreed with the statement that people with head injuries look and act mentally retarded (Gouvier, Prestholdt, & Warner, 1988). *The absence of…obvious language deficit gives the impression that the individual is essentially unscathed* (Naugle & Chelune, 1990, p. 59). Long-term TBI differs so markedly from the stereotype that in many cases the injury is not even considered as an explanation for the child's post-injury disabilities and behavior problems (Gordon et al., 1998).

When a child first comes out of coma, the dramatic and global cognitive-communicative impairment and total self-care dependence resemble the brain-damage stereotype (Begali, 1992; Lash, 1995). However, most of this early impairment is temporary. The passage of time produces a gradual improvement or *recovery slope* that restores essentially normal appearance and routine functioning after all but the most extreme injuries (Berrol et al., 1982). Given the prevailing myth that brain injuries can heal completely (Corbett & Ross-Thomson, 1996; Gouvier et al., 1988; Hux, Schram, & Goeken, 2006; Willer, Johnson, Rempel, & Linn, 1993), it should not be surprising that many hospital visitors interpret this evolution of the symptoms as a total healing process (Boll, 1982; Gronwall et al., 1999; Lehr, 1990). This misperception of emerging wellness can also be seen as wishful thinking by family and other supporters (Hagen, 1982; Lehr & Savage, 1990; Russell, 1993). Hospital staff, family, and the survivor often celebrate school re-entry as the primary milestone of this purported return to normality (Cockrell, Chase, & Cobb, 1990; Lash, 1995; Savage & Carter, 1991; Walker & Wicks, 2005).

Parents often continue to perceive their children as functioning normally after discharge. One study reported that among discharged children with 14 or more identifiable behavior problems from TBI, 40% were regarded by the parents as having no treatment needs (Greenspan & MacKenzie, 2000). Another study found 88% of parents satisfied with their child's cognitive functioning at one year post onset, with 30% reporting that there had been no problems and 46% reporting that the hospital had fixed the problems (Slomine et al., 2006). Ninety-five percent of these parents were satisfied that any psychosocial needs stemming from the injury had been met. This false sense of security prevents most parents from advocating for special education services, and without parental advocacy the services are

almost never provided (Hux, Marquardt, Skinner, & Bond, 1999). As noted above, when educational deficiencies emerge in later years, the family rarely regards them as consequences of the injury (Singer, 1997).

Medical and rehabilitation professionals are not immune to the same stereotype errors. Swift and Wilson (2001) pointed out that former patients, family members, and program staff all attributed a variety of misconceptions to treating professionals, which:

> *. . . included inaccurate beliefs about: time span and extent of recovery; ability to return to work; behavioural symptoms being unrelated to the brain injury; the interpretation of physiogenic symptoms as psychological; the misinterpretation of motivation problems as laziness; and trivializing symptoms and their impact. Misconceptions were mentioned in relation to a number of different health professionals, including hospital doctors, general practitioners, nurses, occupational therapists, and physiotherapists. Inaccurate knowledge among health professionals could have serious consequences in terms of treatment and recovery.* (Swift & Wilson, 2001; pp. 160-161)

Present-day hospital-based clinicians adopt a decidedly short-term focus, as the central purpose of acute treatment has become to facilitate an expedient discharge (Anderson & Catroppa, 2006). From this perspective, rapid physical progress beyond any need for nursing care is often misinterpreted as indicating a good prognosis (Jennett, 1997). Long-term considerations such as the residual cognitive and behavioral impairments and academic deficits are rarely addressed during the medical stay (Katz, Ashley, O'Shanick, & Connors, 2006; Ylvisaker et al., 2001). Referral to rehabilitation, either at the inpatient or outpatient level, was ordered for only 2% of children hospitalized for TBI (National Pediatric Trauma Registry data cited in Savage & Wolcott, 1995). Similarly, one study found that the hospital staff referred only 2% of such children for special education services upon their return to school (DiScala, 1993). In fact, most hospitals do not even contact the schools (Blosser & DePompei, 1991; Hibbard et al., 2001; Savage et al., 2005). When an exceptional physician attempts to provide recommendations to a school, the school is often unreceptive (Schutz, Rivers, Schutz, & Proctor, 2008; Slomine et al., 2006; Tucker & Colson, 1992). Thus, there is almost never any communication between the hospital (where the injury is known) and the school (where the injury is often not known), although TBI experts have urged this information sharing for many years (Begali, 1992; Blosser & DePompei, 2003).

The hospital staff could educate the parents to advocate with the school system for special education services (Mira et al., 1992), but most hospitals offer no formal education program and little or no informal guidance (DiScala, Osberg, Gans, Chin, & Grant, 1991; Gronwall et al., 1999; Mira & Tyler, 1991). Even the education programs of specialized TBI centers are criticized by parents as failing to prepare them for the return to school (Hawley, Ward, Magnay, & Long, 2002; Lash, 1995). Routine communications between hospital staff and parents focusing on the child's physical gains and ignoring the academic disabilities reinforces the parents' misplaced faith in full recovery, and bolsters the inaccurate expectation that the injury will not pose a barrier to education (DePompei & Blosser, 1994).

When students return to school, sometimes following a period of low-demand homebound instruction (Cohen, 1986), many still display some residual acute confusion or passivity (Hagen, 1982). Teachers often grant a *grace period* of relaxed expectations and lenient grading (Lash, 1995; Tucker & Colson, 1992). When the injury takes place early in the school year and the grace period expires, exposing the student's learning and organization deficits, teachers often misattribute these deficiencies to psychological stresses of re-adjustment rather than to educational disability (Clark, 1996; D'Amato & Rothlisberg, 1996).

When new teachers take over in the second year, they have no basis for recognizing the student's special situation (Lehr & Savage, 1990; Max, 2005). They can compare the emerging disablement to pre-onset skills and behavior only through the child's cumulative record file, which is rarely detailed enough to indicate how much the child has changed. Early symptoms are not distinctive enough to be differentiated from other kinds of defective (Begali, 1992; Blosser & Pearson, 1997; Lazar & Menaldino, 1995) or under-motivated performance (Carney, 1995; Lash, 1995). The most prominent features, inconsistency of performance and impulsivity, are shared with emotionally disturbed and underachieving students (Deaton, 1990). Over the years, as their academic shortcomings become more prominent, they still look more like underachieving *normals* than the students who are traditionally

identified with academic disabilities (Glang, Todis, Sohlberg & Reed, 1996; Martin, 2001). Adolescents with TBI are especially difficult to distinguish from immature and emotionally disturbed students (Savage & Woolcott, 1995), and studies have found 15% to 20% of the students identified with Emotional Disturbance to have sustained TBI (Hibbard et al., 2001; Martin, 2001).

Should the parents bring up the past history of head injury, educators tend to be unreceptive: *The more remote the TBI, the less likely it is…to be thought of as playing a role in current difficulties… School personnel are sometimes skeptical about the relevance of a remote TBI because usually children with even severe TBI have a relatively normal physical appearance* (Max, 2005, p. 479). Some administrators, presuming TBI to be a low-incidence disorder, state with certainty that their school does not have any students with TBI (Tyler, 2000).

Training in TBI is not a part of the traditional courses of study for regular education teachers, school psychologists, therapists (Hooper, 2006; Hux, Walker, & Sanger, 1996), and special-education teachers (Funk, Bryde, Doelling, & Hough, 1996). Surveys in the 1990s found that most teachers had also received no inservice training on TBI (Lehr & Savage, 1990; Tyler, 1997). Many educators also demonstrate inaccurate stereotypes of TBI, presumably based on erroneous generalization of their training in other educational disorders: A large survey found that 49% expected no deficit in learning new information, 54% believed that full recovery from severe injury is possible, and 65% agreed that a student with TBI can be normal except for problems in recognizing familiar people (Farmer & Johnson-Gerard, 1997). In addition, 53% of school psychologists believed in full recovery, while 60% endorsed the notion of normality except for recognizing familiars (Hooper, 2006). Finally, most students with TBI show so little insight into disability that they are unable to self-advocate (Gronwall et al., 1999; Ylvisaker, Urbanczyk, & Savage, 1994). Because they do not recognize the injury, most survivors blame themselves for their academic failings and thus carry this additional psychological burden (Gordon et al., 1998).

Two Case Examples

In the late 1990s, *Sandy*, a high-school junior, sustained a severe TBI with ten days of coma and a left temporal contusion impairing his learning ability. A popular, star athlete and clothing model, he planned to attend college on an athletic scholarship and to pursue a career in major league sports. Although he was provided with advanced cognitive rehabilitation including a pre-academic module training studying and test taking (Schutz & Schutz, 2000), he did not apply himself to therapy and had not mastered the techniques when discharged back to school.

Sandy's parents voiced awareness and acceptance of his prognosis for ongoing academic difficulties. Although they understood his need to improve use of the techniques and devote more effort to studying, they admitted to allowing him to study as he pleased. After he was refused special education services because he did not show the IQ/achievement discrepancy of a learning disabled student, the parents accepted accommodations under Section 504 of the rehabilitation act. He met his core academic requirements through half-days of homebound instruction, while being mainstreamed for elective courses in the second half-day. He passed all of these courses and graduated with his class.

Unable to resume his athletic career due to physical sequelae, Sandy instead enrolled in a community college, where he failed the remedial pre-math and pre-English courses. He explained his failure by observing that his sympathetic homebound instructor taught simplified lessons and gave easy tests with special cuing, making it unnecessary for him to master the use of the new learning strategies to which he had been introduced in rehab. He dropped out of college less than a year later, and has worked as a helper in his father's store for several years.

In this case, a well-meaning school staff refused to provide services to which this young man was entitled, and instead substituted such liberal accommodations that he never completed his academic recovery. His failures to achieve in higher education and mainstream employment can be attributed in part to the school's failure to promptly recognize and meet his special needs.

In the late 1980s, *Hester*, a bright, charming eight-year-old, sustained a left frontotemporal depressed skull fracture, which damaged the underlying brain. In five months of inpatient rehabilitation (a common length of stay for severe TBI at that time), she was treated for her language and executive deficits and slow processing. Although she made good improvements in cognition and communication, the staff felt she needed special education placement and wrote letters requesting it. However, Hester's

test scores did not show a large enough discrepancy to qualify her for services under the existing law (PL 94-144). She was promoted at the end of third grade, but with barely passing marks rather than the As and Bs she was accustomed to earning. PL 101-476 was passed in her second year post-onset and the parents continued to apply for special education placement, but she was never granted classification as a TBI student. Her grades gradually declined to consistent failure in high school. Socially, she lost friends and became more isolated each year. In high school she styled herself as a *goth* and associated with the more deviant, drug-using students, but even in this fringe group she was not well accepted. At last report, she had dropped out of high school and become a drug-addicted prostitute.

Hester's case illustrates the downward trajectory of academic and social adjustment and the devastating long-term effects of TBI. Even at ten years post accident, she continued to suffer from low self-esteem and depression because she could not live up to the standards of her peers and family. Despite making a good start in inpatient rehabilitation, she could not continue to adapt to the progressive demands of the mainstream educational system. Her failure to cope at school led directly to a grossly maladjusted post-academic lifestyle.

What Can Be Done?

A stereotype error can be corrected with information. Accurate TBI recognition can be quickly taught to parents (Schutz & Schutz, 2004) and teachers (Max, 2005; Savage & Woolcott, 1995). Teachers and school-based therapists can learn screening for TBI with simple questions about coma duration (Corrigan & Bogner, 2007; Hux et al., 1998) or a more extensive questionnaire (Dettmer et al., 2007). The training can be provided by rehabilitation experts (Blosser & DePompei, 1991; Todis, Glang, & Fabry, 1997; Tyler, 1997) and disseminated by videotape (Forsyth, Kelly, Wicks, & Walker, 2005; Savage et al., 2005), interactive computer program (Glang et al., 2007), or video teleconference (Deidrick & Farmer, 2005).

The state of Massachusetts has made unique and impressive progress in providing this education. According to Debra Kamen, the Director of the Massachusetts Head Injury Program (personal communication, 10/25/07), a staff of clinical neuropsychologists has provided consultations and inservice training to local schools and communities for more than 20 years. Such education appears sufficient to promote advocacy (Cockrell et al., 1990; Waaland, 1990), as demonstrated by Massachusetts' enrollment of 0.6% of their students in TBI programs.

Outreach teams to educate and assist local schools have been developed in Oregon (Glang et al., 2004), Tennessee (Doster, 2001) and Iowa (Department of Education, 2007). New York provides professional consultation on a case-by-case basis (Ylvisaker et al., 2001). Improved identification of TBI cases in these states remains to be demonstrated.

Summary and Conclusions

The public information and epidemiological studies reviewed in this article find less than .05% of students are classified under TBI, whereas the prevalence rate is estimated at 2.5 to 4.7%. Those figures mean that one to two percent of the academically disabled students have been correctly identified and made eligible for the special services they need. It also means that 98% to 99% of the disabled students are either misclassified into programs that cannot help them or unclassified and left on their own. These data define a massive cohort of students who have dropped off the radar screen while becoming academic and psychosocial casualties. Unassisted transition into the community is difficult enough for fully educated children with TBI (Blosser & Pearson, 1997), but those who must build an adult lifestyle on the foundation of an incomplete education are certainly facing an unfortunate future.

Any teacher can identify most of his or her injured students by inquiring about the history of coma or handing out a TBI screening questionnaire. A single lecture can adequately teach parents and professionals that proactive communication with one another is imperative to protect the child's welfare. It seems plausible that the profound problem of these lost children has an easy solution. Of course, it is not enough to find them; they also need the special programming. The present account is expected to heighten concern about how to manage the special needs of such a large cohort of students. A variety of management models have been advanced (Cohen, 1986; Deaton, 1990; Glang et al., 2004; Schutz & Schutz, 2000; Ylvisaker et al., 1994) and can be synthesized into a practical model for large-scale intervention (e.g., Schutz & Schutz, 2004, 2005; Walker, 1997; Ylvisaker, 2005).

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Appendix A:
Sources for Data in Table 1, by State

Alabama. Child Count for October 1, 2007—State Totals: System (including Special Schools) Count by Exceptionality, Ethnicity and Sex.. Retrieved March 29, 2007 from Alabama Department of Education web site: ftp://ftp.alsde.edu/documents/65/EDSER001_State.pdf
See also Alabama Education Quick Facts 2008:
http://www.alsde.edu/general/quick_facts.pdf
Alaska: Department of Education and Early Development: Child Count by District. Retrieved June 10, 2006 from Alaska Department of Education and Early Development web site:
http://www.eed.state.ak.us/stats/ChildCount/051028Childcount.pdf
See also Alaska Department of Education and Early Development Assessment and Accountability: District Enrollment as of October 1, 2005, FY 2006:
http://www.eed.state.ak.us/stats/DistrictEnrollment/2006DistrictEnrollment.pdf
Arizona: Special Education Child Count by Disability. Retrieved October 19, 2007 from Arizona Department of Education web site: http://www.azed.gov/ess/funding/datamanagement/2005-2006/120105CountByDisability.pdf See also 2006 District and Charter Enrollment by County and Grade: http:/www.azed.gov/researchpolicy/AZEnroll/2005-2006/2006countyxgrade_all.pdf
California: *Fact Book 2005—Handbook of Education Information.* Retrieved June 10, 2006 from Department of Education website: http://www.cde.ca.gov/re/pn/fb/documents/factbook2005.pdf
See also Public School Summary Statistics: http://www.cde.ca.gov/ds/sd/cb/sums03.asp
Colorado: Special Education Data Report 1997-98, 1998-99, 1999-2000. Retrieved October 20, 2007 from Department of Education website:
http://www.cde.state.co.us/cdespedfin/download/pdf/general/Data_Report_FY98_00.pdf
See also State Level Student Membership Trends by Ethnic/Racial and Gender, Fall 1996 through Fall 2000:
http://www.cde.state.co.us/cdereval/download/pdf/Fall2000StateMbrEthnicityTrends.PDF
Connecticut: Report of Children with Disabilities Receiving Special Education Part, B, Individuals With Disabilities Education Act, As Amended. Retrieved October 20, 2007 from Connecticut State Department of Education website:
http://www.csde.state.ct.us/public/cedar/cedar/special_education/osep_tables/table1.pdf
See also Enrollment Pre-K to 12 by District:
http://www.csde.state.ct.us/public/cedar/edfacts/enrollment/enrollment_public_pk_to_g12_by_district_2005.xls
Delaware: Retrieved October 27 , 2007 from Delaware Department of Education website:
http://www.doe.state.de.us/info/reports/edstats/files/05/Sept30Enrollment.xls
Florida: Table 17: Traumatic Brain Injured, Fall 2005. Retrieved June 8, 2006 from Florida Department of Education, Statistical Briefs website:
http://www.firn.edu/doe/eias/eiaspubs/pdf/esembrship.pdf
See also http://www.firn.edu/doe/eias/eiaspubs/pdf/pk-12mbrship.pdf
Idaho: School District Programs and Services for Students with Disabilities, Table 5. Number of Students with Disabilities Served in Each Disability Category. Retrieved October 19, 2007 from Idaho Department of Education website:
http://www.sde.idaho.gov/SpecialEducation/docs/Features/LegislativeReport.pdf
See also Fall Enrollment Summary 2004 -2005: http://www.sde.idaho.gov/Statistics/docs/2005-2005FallEnrollment/Fallenrollmentsummary04-05.pdf

Illinois: Illinois State Board of Education Annual Report 2005. Retrieved June 11, 2006 from Illinois Department of Education website:
http://www.isbe.state.il.us/board/pdf/AnnReport2005.pdf , pp 30 and 52.
Indiana: Division of Exceptional Learners Comparison of State APC Funding Count, Group I. Retrieved October 20, 2007, from Indiana Department of Education website:
http://mustang.doe.state.in.us/TRENDS/trends1.cfm?var=enr See also:
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