COBIS
CENTRAL OKANAGAN BRAIN INJURY SOCIETY

Community support, education and prevention services

Community Support Team:

Family Support Services
Child & Youth Services
WIT Employment Program
Individual Community Supports
Peer and Group Training
Public Education
Injury Prevention
Okanagan Conference on Brain Injury

Kelowna Office:
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Kelowna, BC V1Y 7E8
250.762.3233
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Vernon Office:
#201B, 4412 – 27th Street
Vernon, BC V1T 4Y4
250.307-6064

Interior Health Authority

United Way Member Agency

Vancouver Foundation

Kindly advise if there is a change of name or address, or to remove a name from our mailing list.

If you have any questions about COBIS or Gray Matters, please contact us at the above address.

Children & Brain Injury – Resources

Lash, M (1991) *When Your Child is Seriously Injured: The Emotional Impact on Families.* Exceptional Parent, Dept. ML, P.O. Box 8045, Brick, NJ 08723/800-535-1910

Savage, R. & Wolcott, G., ed. (1995) *Signs and Strategies for Educating Students with Brain Injuries: A Practical Guide for Teachers and Schools.* HDI Publishers, P.O. Box 131401, Houston, TX 77219/800-321-7037

Savage, R. & Wolcott, G., ed. (1995) *An Educator's Manual: What Educators Need to Know about Students with Brain Injury.* Brain Injury Association, Inc., 1776 Massachusetts Avenue, NW, Suite 100, Washington, DC 20046/202-296-6443

Taylor L, Kreutzer J, West D, *A Kid's Guide to Brain Injury.* The Department of Physical Medicine and Rehabilitation Virginia Commonwealth University, P.O. Box 980542, Richmond, VA 23298-0542/804-828-9055

Sunny Hill Health Centre for Children. *Understanding Brain Injury – A Resource Guide for Families of Children with Acquired Brain Injuries.* 3644 Slocan Street, Vancouver, BC V5M 3E8/604-453-8300 www.cwbc.ca

Child Development Centre: Centre for Ability 2805 Kingsway, Vancouver, BC V5R 5H9/604-451-5511

Brain Injury: *What Everyone Needs to Know* – www.biawa.org

Community Brain Injury Program for Children and Youth in BC – www.tnc.istar.ca

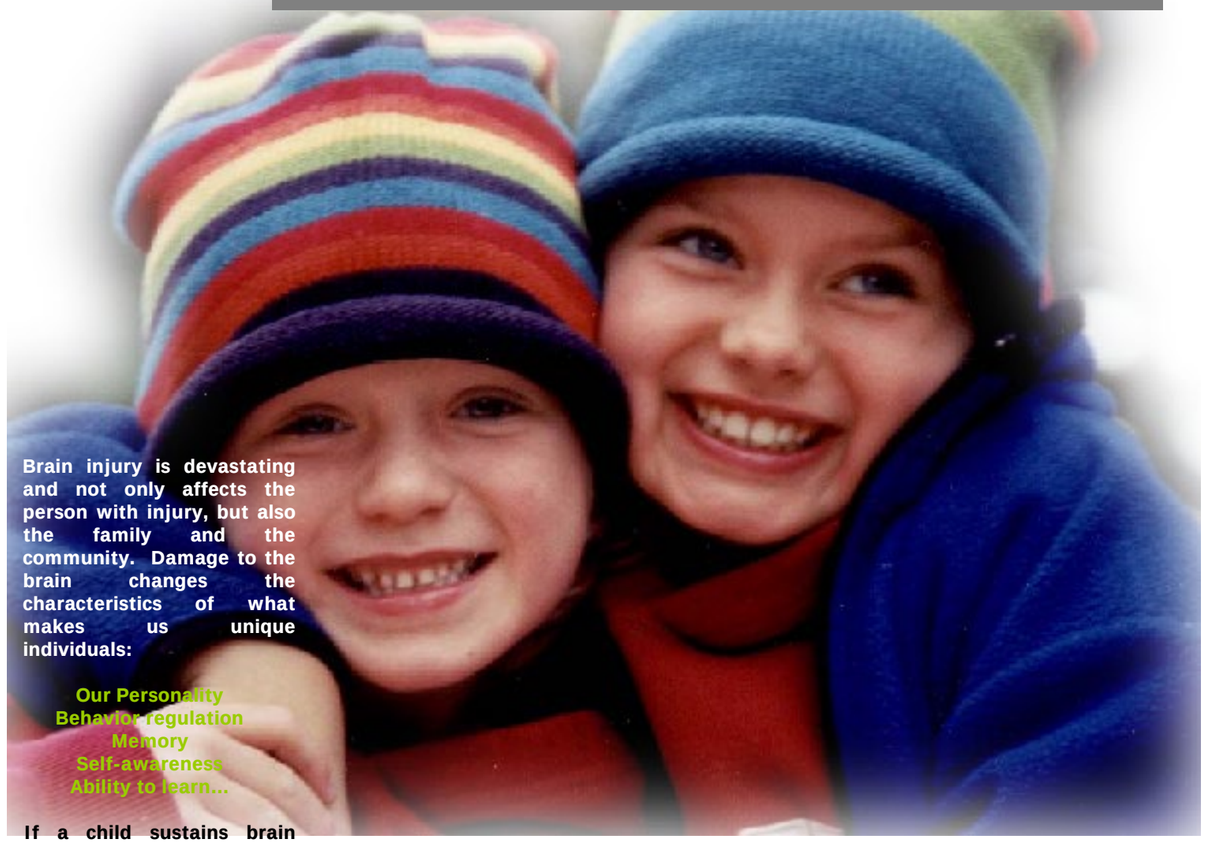
*COBIS currently has over 2500 articles, journals, videos, etc., in the Resource Library. For information, please call: 250-762-3233

COBIS
CENTRAL OKANAGAN BRAIN INJURY

July 2005

Gray Matters

A publication of COBIS – Information on acquired brain injury issues
Education | Prevention | Incidence | Prevalence | Outcomes | Strategies



Brain injury is devastating and not only affects the person with injury, but also the family and the community. Damage to the brain changes the characteristics of what makes us unique individuals:

Our Personality
Behavior regulation
Memory
Self-awareness
Ability to learn…

If a child sustains brain injury while learning these skills, the results are horrendous and last a lifetime.

Often children will recover well physically, however the cognitive and psychosocial deficits continue. These difficulties cause social isolation, emotional turmoil, strained familial relationships and vocational challenges, to name a few.

This issue of Gray Matters is dedicated to the children who live with the daily challenges of brain injury and the caregivers and professionals who support them. Brain injury is an epidemic.

Injuries are Predictable and Preventable

SmartRisk Foundation

Traditionally, we have used the word accident to describe how someone gets injured. Unfortunately, this is where the root of the problem is. An accident is something which is unpredictable, an act of fate, or something over which we have no control. Close scientific scrutiny, however, has revealed that in more than 90% of the cases, the "accident" was understandable, predictable, and preventable. We believe the time has come to eradicate the word accident from our vocabulary. **Injuries are not accidents – they are predictable and preventable events.**

Facts and Figures:

- Each year there are over 2 million Canadians injured and this translates into the disturbing statistic of 6,000 injuries per day or 250 injuries per hour of each day.
- Each and every day 21 Canadians die from unintentional injury... almost one each hour.
- In Canada, injuries are the leading cause of death for persons between one and forty four years of age.
- Injuries kill more Canadian children annually than all other causes of death combined.
- Seven out of every ten teenagers who died in Canada last year, died as the result of a preventable injury.
- Each year over 47,000 people are left with a partial or total permanent disability.
- Each year these injuries generate over $8.7 billion in costs to the Canadian economy. Approximately $4.2 billion was spent on health care and the remaining $4.5 billion represents societal productivity losses associated with losing people from the work force.

Feature Article

A Silent Epidemic

Ronald C. Savage, EdD

Recovery – A Quarterly Journal on Roadway Crashes, Injuries, and Healing (Summer 2001 Volume 12 Number 2)

Traumatic brain injury (TBI) in children is a local, regional and universal epidemic. The impact of TBI remains under-recognized by society at large, it is often misunderstood by professionals, and it continues to be largely ignored by funding agencies. Thus, our young people suffer, families are left without adequate support, and professionals disagree on how best to help these children.

In this article, I discuss the many myths about this condition, detail the developmental impact of TBI on children and review guidelines for treatment.

FACT or FICTION

Inadequate research and a lack of evidence-based practices have curtailed our ability to best serve children with TBI. Our treatment models and practices are limited, and we are often driven by unsubstantiated beliefs. For example:

Myth: TBI is a low-incidence injury.

Fact: TBI affects a larger population than previously thought. Data on more than 80,000 children, recorded in the National Pediatric Trauma Registry (NPTR) in the U.S., show that of children admitted to Level 1 trauma centres just as many had TBI as had fractures.

(Note: According to the Canadian National Trauma Registry, 7,391 children ages 0-20, were hospitalized in Canada for head trauma during 1998-99.)

In addition, "educational registries" used for special-education identification often count children with TBI as learning-disabled, developmentally disabled, emotionally disturbed, suffering from attention deficit disorders, etc. Surveillance systems that properly identify and classify children with TBI show that traumatic brain injury is in fact the largest "acquired" disable and kill of our children.

Myth: A severe brain injury means the child will be permanently disabled; a mild brain injury means the child will have few, if any, problems.

Fact: Patterns of recovery vary with age and type of injury. The measures commonly used to evaluate brain-injury severity (mild, moderate, or severe) were developed for adults, not children. Although most use loss of consciousness as a clinical measure of severity, in reality a child will not lose consciousness as easily as an adult with a similar injury. Thus, a so-called mild TBI or concussion may in fact be very serious and debilitation for a child.

Myth: Normal intelligence scores after TBI mean the child will have no problems learning in school.

Fact: Intelligence test are often unreliable measures of a child's learning ability after TBI. Most intelligence and achievement tests measure prior learning, not new learning capacity. Neuropsychological evaluations, which examine brain-behaviour relationships, give more accurate indication of a child's learning strengths and needs. However, schools rarely use neuropsychological evaluations for educational planning purposes.

Myth: Most brain injuries happen to older children, especially teenagers.

Fact: The majority of brain injuries occur in children under the age of 10. Wile teenagers certainly sustain more injuries in passenger-related motor vehicle collisions, younger children are more frequently injury through violence (shaken baby syndrome), falls, and pedestrian or bicycle related motor vehicle collisions.

What we know…

In an examination of 15,024 American children with traumatic brain injuries, as reported in the National Pediatric Trauma Registry, date were compiled to gain a better sense of who was injured, the kinds of problems these children experienced, and where they were discharged after leaving Level 1 trauma centres.[1] The NPTR defines traumatic brain injury as a non-superficial trauma to the skull and brain.

Injuries related to motor vehicle collisions ranked high among mechanisms of injury, as did falls and bicycle mishaps. Significantly, many of the children included in this study were not properly restrained in motor vehicles or were not wearing protective headgear while cycling.

Children in this study were also evaluated at the Level 1 trauma centre for functional status at discharge, with assessment of behaviour, cognition, speech, hearing, and vision and their ability to walk, dress, bathe, and feed themselves.

As the number of functional limitations increased – from one to three limitations to four to seven – cognitive and behavioural limitations increased correspondingly. Thus, more serious injuries caused more cognitive and behavioural limitations. Children injured as pedestrians or as motor vehicle occupants typically suffered a higher number of limitations than those injured in other ways.

"more serious injuries caused more cognitive and behavioural limitations"

It might seem logical that children who sustain traumatic brain injuries severe enough to be admitted to a Level 1 trauma centre will more than likely need extended rehabilitation services and/or extended outpatient services. However, while some children did receive these services, many did not. Many of the children with four to seven functional limitations at discharge received only outpatient physical or occupational therapies, and fewer than 2% of the children in this study were even referred to special educational services at discharge.

"Earlier beliefs that younger children recovered from TBI better than older children may recognize only the 'medical recovery' of the brain"

…and what we need to know

Although the NPTR records data on children admitted to a Level 1 trauma centre, it does not follow children back into the home, school, and community. We need to recognize not only that the incidence of TBI among children is high but also that the challenges these children experience are often lifelong. Hence, it is important to understand the brain's physical maturation stages through childhood in order to predict the long-term impact of traumatic brain injury on continued development.

In the past decade, researchers have been using the latest technology to understand how children's brains grow and mature. The concept of plasticity, for example, is much more complicated than many neuroscientists previously thought. Earlier beliefs that younger children recovered from TBI better than older children may recognize only the "medical recovery" of the brain.

Through developmental studies and techniques such as neuropsychological testing, magnetic resonance imaging, and special uses of electroencephalography, critical discoveries are being made about how the brain grows and matures throughout childhood.

Five peak maturation periods have been identified:

Newborn to 6 years: During this period of overall rapid brain growth, all regions of the brain – those governing frontal executive, visuospatial, somatic, and visuoauditory functions – show signs of synchronous development. Children perfect such skills as the ability to form images, use words, and place things in serial order. They also begin to develop tactics for solving problems.

Age 7 to 10: The sensory and motor systems continue to mature in tandem up to about age seven and a half, when the frontal executive system begins accelerated development. The maturation of the sensory motor regions that begins at about age six peaks just as children begin to perform simple operatonal functions such as determining weight and logical-mathematical reasoning. By age 10, while visual and auditory regions of the brain mature, children are able to perform formal operations such as calculations and perceive new meaning in familiar objects.

Age 11 to 13: This stage primarily involves the elaboration of the visuospatial functions, but it also includes maturation of the visuoauditory regions.

Age 14 to 17: In these years, successive maturation of the visuoauditory, visuospatial, and somatic systems reach their maturational peak within one-year intervals of each other. Young people enter the stage of dialectic ability. They are able to review formal operations, find flaws with them, and create new ones. Meanwhile, the visuoauditory, visuospatial, and somatic systems of the brain continue developing.

Age 18 to 21: During the final stage, which begins around 17 or 18 years, the region governing the frontal executive functions matures. Young people begin to question information they are given, reconsider it, and form new hypotheses incorporating ideas of their own.

Brain maturation occurs via immediate and abrupt changes during childhood. Thus, the age of the child when injured and the region of the brain most affected may help predict the kinds of cognitive and learning challenges the child will experience now and in the future.

For example, a three-year-old child who suffers a frontal-lobe injury after a fall from a second-storey window may appear to "recover" well in three or four months' time. However, as the child gets older and his or her brain continues to mature, the damage to the frontal systems may create new cognitive-behavioural challenges as the child reaches the middle or secondary school years. Unfortunately, the child's teacher may not even know about the earlier TBI or may assume that the injury has already "healed".

As the child continues to mature, problems may be further exacerbated until this young person is seen as having behavioural or psychiatric problems. Knowledge of the long-term impact of injury upon the developing brain will allow health and education professionals to predict what resources they'll need to better support the child in school, at home, and in the community.

In summary, TBI in children is a silent epidemic for several reason, including lack of proper identification of affected children, poor understanding of TBI, a paucity of research on evidence-based treatments, and inadequate information on how TBI affects development.

As well as continuing research on this population, we need to work together – whether we're health-care professionals, family members, service funders, or other concerned parties – to better service children with brain injuries. Above all, we must strive to prevent TBI from happening to our children in the first place.

1. R.C. Savage, "An Analysis of 15,024 Children with Traumatic Brain Injury," Brain Injury Association Annual Symposia, July 2000.

The Incidence of Traumatic Brain Injury Among Children in the United States

Difference by Race

Jean A. Langlois, ScD, MPH; Wesley Rutland-Brown, MPH; Karen E. Thomas, MPH

Objective: This report summarizes the epidemiology of traumatic brain injury (TBI) deaths, hospitalizations, and emergency department (ED) visits by race among children aged 0-14 years in the United States. Few other studies have reported the incidence of TBI in this population by race. **Methods:** Data from 3 nationally representative sources maintained by the National Center for Health Statistics were used to report the annual numbers and rates of TBI-related death, hospitalizations, and ED visits during 1995-2001 by race, age and external causes of injury. **Results:** An estimated 475,000 TBIs occurred among children aged 0-9 years, both death and hospitalization rates were significantly higher for blacks than whites for motor vehicle-traffic-related TBIs. **Conclusion:** With nearly half a million children affected each year, TBI is a serious public health problem. Variation in rates by race suggest the need to more closely examine the factors that contribute to these differences, such as the external causes of the injury and associated modifiable factors (e.g., the use of seat-belts and child safety seats). Journal of Head Trauma Rehabilitation Vol. 20, No.3, pp229-238