Head Injury Prevention Project

BIKES, BLADES & BOARDS

10 YEARS

2009 Program Summary Report

Background

In 1996, clinical staff with the Acquired Brain Injury (ABI) Program at Hamilton Health Sciences (HHS) came together to form a committee known as the Head Injury Prevention Project (HIPP).

HIPP's mission statement was:

> ***In collaboration with community partners and through participation in community events, our aim is to increase awareness of the occurrence of head injury, promote safe participation in recreational and sporting activities and provide an educational resource for the prevention of head injury.***

HIPP members began to study the prevalence of recreational head injury and to develop injury prevention educational materials, directed mostly at children and youth. HIPP members would participate at local events, conferences, and safety days and disseminate injury prevention educational materials, answer questions, and promote safety in recreational activities.

In 2000, HIPP, in collaboration with Hamilton's Department of Public Health, initiated a pilot project in area elementary schools known as **Bikes Blades & Boards** (BB&B). Bikes Blades & Boards was developed as an in-school brain injury prevention education program and helmet fitting demonstration. Presentations were organized in 7 Hamilton-area schools (100 grade 2 students).

The students were given an injury prevention talk that included an introduction to the various functions of the brain, demonstrations around injury and injury prevention, a helmet evaluation, and an opportunity to ask questions and interact with the presenters. Presenters were recruited from clinical staff at the ABI program.

This pilot project was favorably received and, for this reason, repeated the following year. Bikes, Blades & Boards has continued each year now for **10 years** presenting to **23,955** Hamilton, and surrounding area grade 2 students, to date. Demand for the program has seen growth into Boards of Education in Peel, Niagara, and Haldimand-Norfolk regions.

BB&B 2009

School applications were distributed in March 2009 and returned up until the deadline of April 17 2009. 117 schools from Hamilton's Public and Catholic school systems as well as the Niagara, Haldimand-Norfolk and Peel Region School Boards applied. **99** of these schools received a presentation by the school year end (end June).

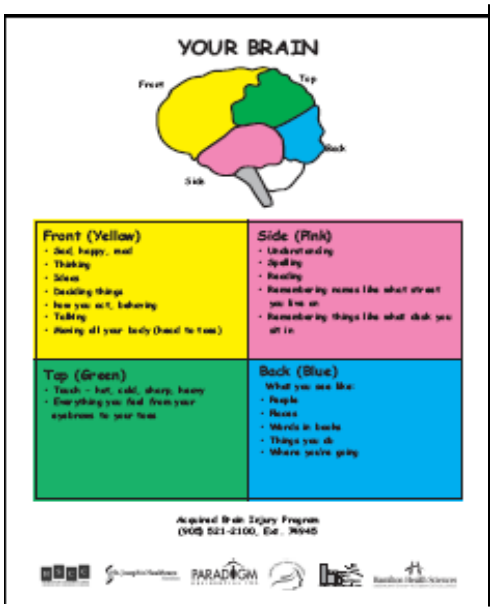
70 volunteers primarily from Brain Injury Services (BISH), Hamilton Health Sciences' ABI program, St. Joseph's Centre for Mountain Health ABI Program, and Paradigm Rehabilitation & Nursing Services conducted presentations in **220 classes** and to **4382 students.**

The Curriculum

For the presentations, each volunteer would undergo an orientation session to familiarize themselves with the curriculum. The curriculum has four main components. They are as follows:

1. *What is your brain? How does it work?*

Here each child received a color-coded picture of the brain depicting the four main lobes. In color-coded text boxes on the page were descriptions of the functions of these lobes in language suitable for grade 2 comprehension. Presenters would discuss these functions in simple language and table questions from the children.



2. *What happens when your brain is injured?*

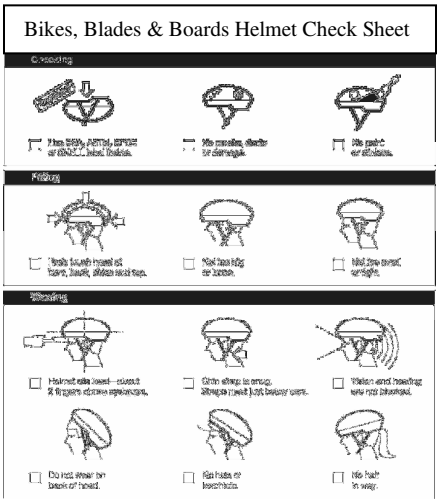
Presenters, using 2 cauliflowers, drop one without a helmet first, then one strapped into a helmet. Discussion was encouraged and presenters would answer questions from the children.

3. *Video*

A short "local production" video was aired offering the same injury prevention/wear your helmet message as in the presentation. The video is considered a medium appealing to children of this age and local celebrities (i.e., CFL football stars) appear.

4. *Helmet fitting*

Children were asked to bring their helmets on the day of the presentation. Using the checklist (below), presenters would evaluate the child's helmet entering "Yes" or "No" for each criterion. Where appropriate, adjustments were made.


Bikes, Blades & Boards Helmet Check Sheet

The check sheets were carbon copied and children were given a completed sheet to bring home to their parent or guardian for review. They were encouraged to speak to their families about the merits of wearing helmets while participating in roller sports and cycling.

The second carbon copy was returned to the program coordinator and evaluated across the three categories outlined on the sheet (checking, fitting, wearing).

For those who had remembered to bring their helmets (1709 students), check sheets were gathered and analyzed.

Data Collection

For 2009, the Bikes Blades and Boards Program yielded 1709 valid helmet checks. This is a revised total. Each year, there are a percentage of helmet checks that are completed incorrectly or only partially and must be discarded. More attention has been given to the program orientation that presenters must undergo prior to attending at the schools, however, improvements in this area have been modest. Continuing review of this orientation process to improve the percentage of valid helmet checks appears necessary.

A comparison between results from 2009 and those from previous years provides us with unique insight into how children's helmet wearing habits have changed over the years.

The table (on the following page) provides an outline of the data across each year of the program.

Bikes Blades & Boards Grade 2 Education Program
Year-to-Year Statistical Comparison

	Pilot									
Checking	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Has Certification Sticker	87%	78%	82%	93%	93%	93%	93%	93%	92%	87%
No Cracks or Dents	83%	79%	77%	85%	86%	84%	85%	82%	84%	77%
No Paint or Stickers	N/A	85%	77%	90%	94%	88%	92%	87%	89%	86%
Checked as "Perfect"	N/A	61%	52%	72%	71%	71%	74%	74%	74%	66%

Fitting	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Pads fitted to child's head	85%	73%	71%	76%	77%	80%	85%	84%	84%	82%
Not too big or loose	76%	66%	66%	74%	64%	74%	76%	73%	78%	72%
Not too small/tight	76%	86%	82%	86%	92%	89%	90%	85%	90%	86%
Fitted as "Perfect"	N/A	53%	46%	57%	53%	63%	65%	63%	70%	61%

Wearing	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Helmet sits level	72%	72%	82%	79%	71%	70%	80%	80%	84%	77%
Chin strap snug and correct	78%	46%	53%	47%	48%	41%	57%	55%	57%	65%
Vision/hearing not blocked	99%	91%	87%	95%	96%	94%	95%	92%	94%	92%
Sat correctly on head	N/A	80%	84%	83%	79%	74%	86%	83%	86%	83%
No hat/kerchief under helmet	N/A	92%	90%	97%	98%	96%	97%	93%	94%	94%
No hair in the way (ponytails)	N/A	85%	84%	89%	91%	90%	91%	90%	91%	93%
Worn perfectly	N/A	42%	45%	33%	37%	28%	43%	43%	48%	53%
	N=100	N=728	N=424	N=995	N=1215	N=1048	N=1261	N=1127	N=892	N=1709

N/A: The category was not evaluated during the year's presentations.

The **"Checking"** section of the Helmet Check evaluates the type and condition of the child's helmet. In the past several years, roughly three out of four children presented helmets that were certified, and in good repair. This year, that number has dropped (from 74% in the past 3 years to 66%). While almost all children presented a certified helmet (87%), without paint or stickers (86%), 23% were using damaged helmets (which is an increase of almost double from previous years - average at 14%).

Children were again reminded that 1. Bicycle helmets are typically single impact helmets (other than the hard shell "extreme" skateboarding helmets). They lose their protective capability and need replacing once damaged, and 2. It is preferable that they wear a damaged helmet over none at all. They should, however, replace it as soon as possible.

The" **Fitting**" category involves an examination of how the fit-pad or retention system is adjusted and whether or not the child has purchased the appropriate sized helmet. In 2009, helmet check results dropped (61%) in comparison to 2008 (70% -the year with the best results in this category over the past 10 years). There continues to be a significant number of children assessed wearing helmets that are inappropriately sized and/or adjusted, and this can contribute to increased chances of injury during a fall[1].

As in previous years, it appeared the main reasons children presented poorly fitted helmets were because parents, or caregivers:

1. Had purchased a helmet larger than required so that they could "grow into it" and, accordingly, it will last longer;

2. Allowed "hand me down" helmets from older siblings and/or sharing of helmets between similarly aged siblings;

3. Allowed their child to continue wearing a helmet that they have grown out of;

4. Did not know how to properly adjust the helmet's retention system, thus causing a correctly purchased helmet to fit incorrectly.

Education was provided to the children regarding the importance of a helmet purchased just for them, and that fits properly. It would appear that education aimed at parents would be helpful in this regard also[23].

The **"Wearing"** category has, over each year, provided results, in relation to the other categories, that are the poorest. In 2009, this number has improved. While still only close to half of the children evaluated demonstrated a properly worn helmet (53%), this is an improvement and represents the best outcome in this category ever. Most areas in this category yielded reasonably high results (between 83% and 94%), and it was encouraging to verify that most children could independently position a helmet on their heads such that it did not interfere with vision or hearing. As in previous years, however, the children had difficulty adjusting the chinstrap such that it secured the helmet on their head appropriately (65% of children demonstrated this ability which is an improvement from 57% in 2008 – and a dramatic improvement from 41% in 2005).

---

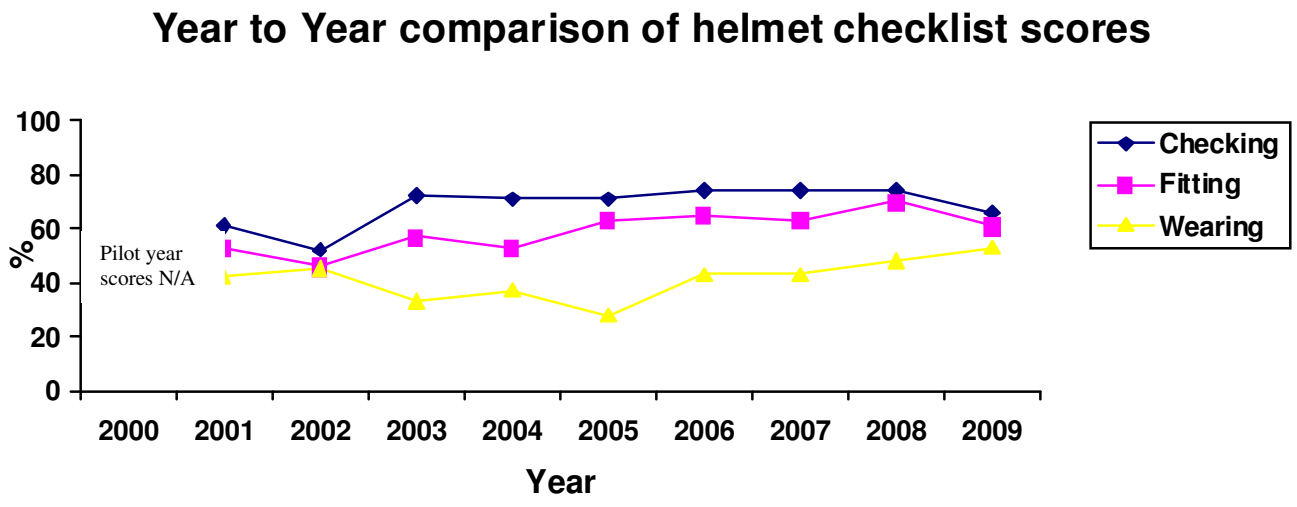
[1] Rivara FP**,** Astley SA, Sterling KC, Thompson DC, Thompson RS. **Fit of bicycle safety helmets and risk of head injuries in children**. *Inj Prev.* 1999;5:194-197.

[2] Berg, P., Westerling, R. (2001). **Bicycle Helmet Use among Schoolchildren - The Influence of Parental Involvement and Children's Attitudes.** Injury Prevention; 7: 218-222

[3] Ehrlich, P., Longhi, J., Vaughan, R., Rockwell, S. (2001). **Correlation Between Parental Perception and Actual Childhood Patterns of Bicycle Helmet Use and Riding Practices: Implications for Designing Injury Prevention Strategies.** Journal of Pediatric Surgery; Vol. 36, No. 5 (May): 763-766

In the 10 years of evaluations, the overall "**Wearing** " category results never surpassed 50% until this year, and this is encouraging (2009 0verall "Wearing" = 53%). Although it is outside the scope of this program, it would be informative to analyze evaluation results across certain demographics (school board, municipality, neighborhood). That the program has grown into new areas of the province, it would be useful to know if the improvement is overall or if evaluations completed in new communities (possibly featuring other and different injury prevention initiatives) had skewed our previous, more local, results upward.

In the graph below, the 3 category (Checking, Fitting, and Wearing) results are graphically represented over the past 10 years.



Although the overall scores within the Checking (66%) and Fitting (61%) categories have remained higher relative to Wearing (53%), this year only Wearing has shown improvement while both Checking and Fitting have dropped.

Summary

In 2008, BB&B program coordinators completed a study evaluating the effect of the presentations on the participating children[4]. This case-control study evaluated participant children (study group) pre-BB&B, one week post BB&B, and one year post BB&B and compared their scores with a control group of BB&B naive students. The study group, when compared with the control group, showed a statistically significant improvement in their ability to independently, present, fit and wear a helmet. This evidence that the BB&B education program is effective is very encouraging and has stood as the basis for continuing efforts with this program.

Without the generous support of our community partners (Hamilton's Safe Communities, Brain Injury Services, Paradigm Rehabilitation & Nursing, and Hamilton's

[4] Blake, G, Velikonja, D, Pepper, V, Jilderda, I, and Georgiou, G, **Evaluating an in-school injury prevention programme's effect on children's helmet wearing habits** Brain Injury, June 2008; 22 (6), pp. 501-507

Brain Injury Association), and without continuing volunteer participation provided through the generosity of St. Joseph's Health Care, Hamilton Health Sciences, Paradigm Rehabilitation & Nursing, and Brain Injury Services, this program (regardless of efficacy) would not continue. This program began as a volunteer activity and has grown through the tireless collaboration of a group of clinicians interested to do more. There has never existed an annualized budget for Bikes, Blades and Boards. It starts each year with the same questions and concerns, and each year our partners step up and answer these questions. Close to 25,000 area grade 2 children (the first of whom are now high school graduates) have now benefitted from this program. It is our hope that the Bikes Blades and Boards program will continue

Prepared by: ***Gary Blake, Chair, Head Injury Prevention Project***
Acquired Brain Injury Program, HHS

and

Ilda Nardini, Coordinating Partner – BB&B
Brain Injury Services (BISH)

Presentation Volunteers (70)

Cairney Martin	Shirley Martin	Danielle Perkin	Ryan Ibay
Gary Blake	Veronica Pepper	Gene Uchida	Rachel Willard
Rebekah Jackson	Dianne Lech	Denise Sartor	John Zsofscin
Erin Sherriff	Sue MacDougall	Rebecca Long	Rebecca Bond
Sue Ruzzier	Darlene Ormond	Jessica Bagu	Heather Archibald
Nimi Singh	Toni Gillis	Marco Leocadio	Teresa Groth
Tiffany Cairns	Perry Scott	Rebecca Smylie	Mike Ord
Stacie Dertinger	Ilda Nardini	Amanda Gregory	Angie McGuire
Dina Vandenberg	Irene Jilderda	Rick Zagrodski	Paul Sartor

Tina Solary	Julie Ball	Carolyn Galand	Jessica Goakery
Lisa Courtney	Kate Layard	Janice Amarel	Christina Versteeg
Andrea Kutney	Erica Powell	Sarah Matthews	Ted Newbigging
Kristen Bouma	Allan Hagen	Catherine Hobers	Caresee LeBlanc
Brian Freel	Whitney Everson	Cathy Lockett	Fernanda Carvalho
Mark Masterson	Michelle Joden	Carrie Sawatsky	Kathryn Gibbs
Jennifer Rodgers	Brandy Pikington	Josh Doucet	Kristen Leslie
Karen Coon	Bob Helwig	Nicole Letang	Ali Nakoneshny
Beth Ellis	Allison Cwalinski	Julie Cope	Beverley Riemersma

---Final Version Submitted 7 October 2009---