



Concussion Awareness Training Tool for Parents, Players & Coaches

Evaluation Report

April 2015



The British Columbia Injury Research and Prevention Unit (BCIRPU) was established by the Ministry of Health and the Minister's Injury Prevention Advisory Committee in August 1997. BCIRPU is housed within Developmental Neurosciences and Child Health Cluster (N2N) of the Child and Family Research Institute. BCIRPU's vision is "to be a leader in the production and transfer of injury prevention knowledge and the integration of evidence-based injury prevention practices into the daily lives of those at risk, those who care for them, and those with a mandate for public health and safety in British Columbia".

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Overview

Concussions are a brain injury caused by a direct blow to the head or body resulting in a rotational movement of the brain within the skull. It is important to recognize that a concussion can occur with or without loss of consciousness and symptoms can be subtle, including headache, confusion, nausea or dizziness. You cannot always tell right away if someone has a concussion as symptoms may not appear for hours or up to several days.

The leading causes of concussion are from falls, sport and recreation activities, and motor vehicle crashes. The recommended treatment for concussion includes both physical and mental rest. Mental rest includes limited reading and screen time (e.g., TV, computer, tablet, gaming, and texting). Children are at a greater risk for concussion than adults, can take longer to recover, and are at higher risk for permanent brain damage.

If an individual returns to activity too soon and a second concussion is sustained before recovering from the first, a condition known as second-impact syndrome (SIS) may occur: a swelling of the brain that can result in brain damage causing severe disability or even death. You are three times more likely to sustain a second concussion if you are still recovering from a concussion.

Parents are central to the management of their child's concussion recovery. They are responsible for monitoring their child on a day-to-day basis, seeking medical attention, and ensuring their child follows recommended treatment.

The *Players* themselves, children at risk for concussion, also need to understand what a concussion is and how it occurs, what the symptoms are, and the importance of acknowledging a potential concussion.

Coaches, including community volunteer coaches, need to know the principles of concussion management to allow them to identify high-risk activities, compile pre-participation information, and take appropriate action when a player sustains an injury that could cause a concussion.

The Canadian Paediatric Society recommends that anyone involved in child and youth sport should be educated about the signs and symptoms of concussion and the appropriate management of a child with a concussion. To learn more about concussion, visit the Online Concussion Awareness Training Toolkit (CATT) for Parents, Players and Coaches (PPC) at www.cattonline.com.

The online Concussion Awareness Training Tool (CATT) for Parents, Players and Coaches was developed to provide

up-to-date educational training on the prevention, recognition, treatment and management of concussions in the form of:

- 32 minute online training video for parents and coaches
- Frequently asked questions for parents
- Concussion videos appropriate for youth
- Printable handouts for parents and coaches
- The Concussion Response Tool for Parents (smartphone accessible and fillable)
- Questions to ask your Doctor Resource
- The Return to Learn Communication Tool for parents and educators
- The Return to Play Communication Tool for parents and coaches

The purpose of this evaluation for CATT was to determine if attitudes and knowledge were significantly improved among parents with a child registered in an organized sport following completion of CATT.

Parents were recruited to complete pre and post-intervention surveys designed to measure changes in attitudes and knowledge around concussion recognition and management.

The survey was administered using FluidSurveys (www.fluidsurveys.com), a secure Canadian online survey company. Participants completed the survey before the intervention (before completing CATT) and subsequently completed the same survey again 3 to 4 months post intervention. A total of 35 parents completed the study. The recruitment period for this study was extended due to low response rates.

The data demonstrated that parents had a statistically significant positive change in concussion knowledge, but no change in attitudes. Attitude scores were, however, seen to be high to begin with, prior to release of CATT PPC.

Good concussion management may decrease the risk of brain damage and potentially reduce long-term health issues. CATT is being rolled out provincially in British Columbia, Canada. Funding for this project was provided by the BC Ministry of Health and LIFT Philanthropic Partners.

Introduction

Concussion, a mild traumatic brain injury, has received enormous attention in recent years, both in lay as well as the scientific literature. The Centers for Disease Control has estimated that 1.6 to 3.8 million cases of sport-related concussions occur annually in the United States [1]. Sport and recreational activities contribute to about 21% of all traumatic brain injuries among children in the US [2]. This means that nearly 80% of head injuries are not sports-related.

A concussion can occur to anyone from a variety of causes, such as hitting your head while falling down a flight of stairs, falling off a slide in a playground, or running into a door frame. In British Columbia, there were 2,475 hospitalizations due to concussion from 2001 to 2008, averaging 309 cases per year. Of these, 43% were among children and youth 0-19 years of age, 34% among adults 20-54 years, and 23% among older adults 55 years and over. Further, the BCCH ED alone saw 1,362 children and youth with concussion and minor head injuries in 2009 (as reported by the BCCH CHIRPP database, Children's Hospital Injury Reporting and Prevention Program). Of these, 454 parents and caregivers indicated that they are willing to be contacted for research purposes regarding these incidents.

Concussions are caused by a direct blow to the head or other body part resulting in a rotational movement of the brain within the skull. It is important to recognize that a concussion can occur with or without loss of consciousness and symptoms can be subtle, including headache, confusion, nausea or dizziness, and may not appear for hours or days. Recommended treatment includes both physical and mental rest [3]. If an individual returns to activity too soon and a second concussion is sustained before recovering from the first, a condition known as second-impact syndrome (SIS) may occur: a swelling of the brain that can result in brain damage causing severe disability or even death [3]. Furthermore, an individual is three times more likely to sustain a second concussion in recovery from a concussion [4].

Despite being an issue for the whole population, the concussion management debate among brain-injury experts has revolved around sports-related injury and the need to remove athletes immediately from play. Not allowing same day return may lead to athletes hiding their injury or coaches encouraging them not to disclose symptoms. Inconsistent protocols for recognition, treatment and management further contribute to this controversy. A 6-step gradual return to play protocol

should be strictly adhered to, to ensure that the brain has fully recovered, thereby reducing the risk of SIS [3].

The short- and long-term effects of concussion can vary from person to person and can greatly affect their quality of life. A significant percentage of professional hockey and football players, as well as high school athletes, with previously reported concussions or other head-related injury were found to have reported an impact on their social and professional lives including difficulties at work, attending school, playing sports and other simple activities such as riding stationary bicycles or lifting weights [5]. This implies that the long-term effects of concussion are often not recognized early enough to prevent post-concussion syndrome and permanent brain damage.

Although concussion has not been recognized as a potentially life threatening condition in the past, SIS is the most catastrophic and lethal brain injury resulting from sport-related trauma [6]. One cause of recurrent concussions may be when athletes return to play prematurely [4]. Parents, players, coaches, must be supported in becoming better educated in the identification and management of concussion, and made aware of the increased risks of additional injury by ignoring concussive symptoms [6].

The Zurich Consensus Statement on concussion in sport is the most up-to-date set of principal messages regarding the evolving science of concussion [7]. This resource includes discussion on concussion; concussion evaluation (signs & symptoms); concussion investigations (diagnosis); concussion management (physical and cognitive rest); modifying factors in concussion management (e.g. extent of loss of consciousness); special populations (e.g. adolescent athletes); injury prevention (e.g. protective equipment); and knowledge transfer and mobilization. Despite this work, concussion continues to be an under-recognized, -diagnosed and -treated medical condition in BC; specifically, the need for physical and mental rest, and the risk of SIS are often ignored.

This initiative provides the opportunity to evaluate a new on-line educational resource for parents, players and coaches, to improve concussion prevention, awareness and management.

Rationale

No area of sports medicine involves more clinical uncertainty and controversy than concussion management [8].

The failure to recognize and report concussions may result from a lack of a standardized knowledge-base regarding the signs and symptoms of concussion [9]. Furthermore, a growing body of literature indicates that the immature brain is more vulnerable to diffuse injury while there are only few published research studies that focus specifically on concussion in young athletes [10]. Standardized knowledge for recognizing and managing the concussed athlete at any age, with special attention devoted to the young athlete, continues to be lacking among parents, players and coaches.

The Canadian Paediatric Society recommends that anyone working with children should be educated about the signs and symptoms of concussion and the appropriate management of a child with a concussion [11].

Concussions can cause mental fatigue, slow processing and difficulty in learning new information: all affecting a student's ability to participate and learn. Research has shown that children benefit from a controlled, gradual return-to-learn process when returning to school. Not following a stepwise process when returning to normal functioning can result in a student's symptoms being prolonged and, if another head injury occurs, permanent damage can result.

This project is based upon previously determined principles regarding concussion recognition, diagnosis, treatment and management, thus reducing replication of efforts and demonstrating an efficient use of resources.

Impact: Appropriate concussion recognition and management has the potential to reduce adverse outcomes and decrease the risk of SIS among the children and youth in BC. This initiative has the potential to reduce total health care costs among these patients.

Objectives

To evaluate the *On-line Concussion Awareness Training Toolkit for Parents, Players and Coaches* (CATT PPC) in order to establish an effective and reliable on-line concussion education resource that parents, players and coaches can refer to, outlining concussion prevention, awareness and management.

Methods

The evaluation of CATT PPC is a pre/post-intervention comparison undertaken in partnership with minor hockey, football, ringette, soccer, lacrosse, and gymnastics

associations within the BC Lower Mainland, Fraser Valley and the Victoria area.

The evaluation focused on parents of children and youth registered in at least one of these sports clubs. The parent survey was administered using FluidSurveys (www.fluidsurveys.com), a secure Canadian on-line survey company. Participants completed this survey before the intervention (CATT PPC) and completed the same survey again 3 months post-intervention. Participants were sent a link to the CATT PPC following completion of the pre-intervention survey.

Inclusion Criteria: Parents of children/youth currently registered for an organized sport in at least one of the participating sports clubs.

Exclusion Criteria: Parents of children/youth not currently registered for an organized sport in at least one of the participating sports clubs.

Recruitment: Parents were recruited via e-mail invitation (Appendix A) sent from within the participating sports clubs. Potential participants were directed to an on-line survey to register and consent (Appendix B) for the study and to complete the pre-survey (Appendix C).

Sample Size: To compare the change in pre/post-survey scores with the power to detect a large effect size of 0.5, a sample size of at least 33 is required.

Participants who completed the study were entered into a draw for an iPad Mini.

Data Analysis

Data collected in the pre- and post-intervention on-line surveys (Appendix C) were analyzed in order to measure changes in concussion knowledge and attitudes among parents with children participating in organized sports. Summary statistics are presented. A total score was developed for both attitudes and knowledge based on survey responses. A comparison of the pre- and post-intervention scores has been made by using a paired t-test to determine the effectiveness of CATT PPC to change attitudes and knowledge among parents.

Results

Demographics

A total of 35 participants completed the pre- and post-intervention surveys. This group was represented of 62.9% of participants identifying themselves as females and 37.1% males. Of these, 65.7% identified having an experience with a concussion; 91.4% of participants had at least one child registered in a BC organized sport; and 54.3% reported their child had suffered a concussion.

Participant Demographics, n=35

Age		Gender	
15-24 years	0%	Male	37.1%
25-44 years	48.6%	Female	62.9%
45-64 years	51.4%		
65+ years	0%		
Primary Language		Registered*	
English	100%	Yes	91.4%
Other	0%	No	8.6%
Highest Level of Education		Estimated Household Income	
<High School	0%	<\$20,000	0%
High School	8.6%	\$20-\$39,000	0%
College Diploma	28.6%	\$40-\$59,000	2.9%
Bachelor Degree	37.1%	\$60-\$79,000	5.7%
Masters Degree	14.3%	>\$80,000	91.4%
Other	11.4%		
Family Doctor		Child Suffered a Concussion	
Yes	94.3%	Yes	54.3%
No	2.9%	No	42.9%
Unknown	2.9%	Unknown	2.9%
Experience with Concussion			
Yes	65.7%		
No	34.3%		

*at least one child registered in a BC organized sport

Attitudes

The following section presents the pre- and post-intervention attitude results (Appendix D).

A1: When comparing results between the pre- and post-intervention survey results, the post-intervention results showed an improvement in attitude when judging whether a concussion could be a significant threat to their

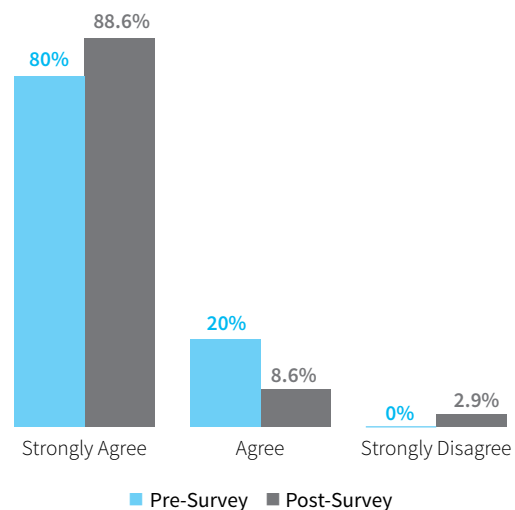


child's health: 80% of participants strongly agreed in the pre-intervention survey compared to 88.6% of the post-intervention survey.

A2: In the pre-intervention survey, in determining whether parents of children in organized sports already understand about concussion and what to do, the results showed that 28.6% of participants strongly disagreed and 57.1% disagreed with the statement. In comparison, in the post-intervention survey, more participants were neutral about this statement than in the pre-intervention survey.

A3: When judging if coaches of organized sports knew enough about concussion recognition and management, majority of participants disagreed and strongly disagreed in the pre-intervention survey. In the post-intervention survey, the results were unchanged in that the majority of participants also agreed and strongly disagreed.

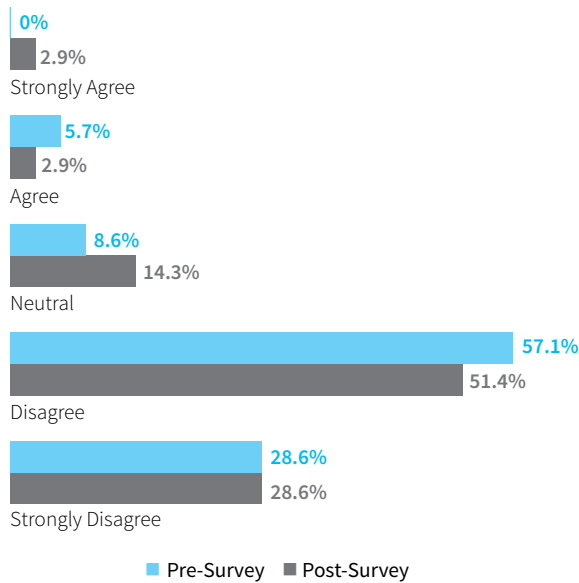
A1. Concussion could be a significant threat to my child's health.



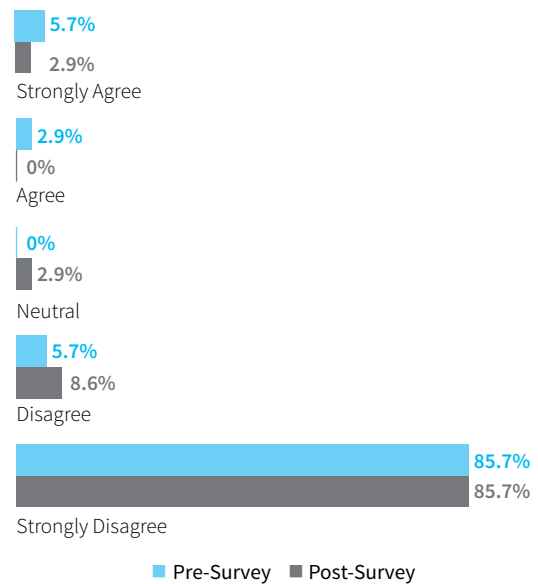
A4: When judging if participants agreed with the statement that getting a concussion while playing sports is really not a big deal, majority of participants in both the pre- and post-intervention surveys stated they strongly disagreed.

A5: When judging whether it is the parent's job to be knowledgeable regarding concussion recognition and management, majority of the participants from both the pre- and post-intervention surveys felt that they strongly agreed with this statement.

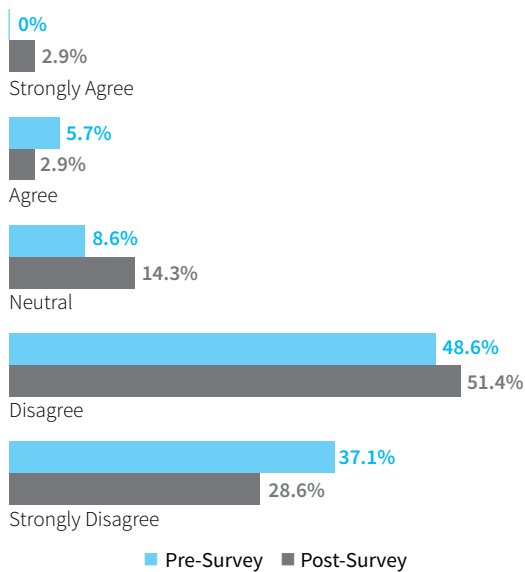
A2.
Parents with children in organized sports already understand about concussion and what to do.



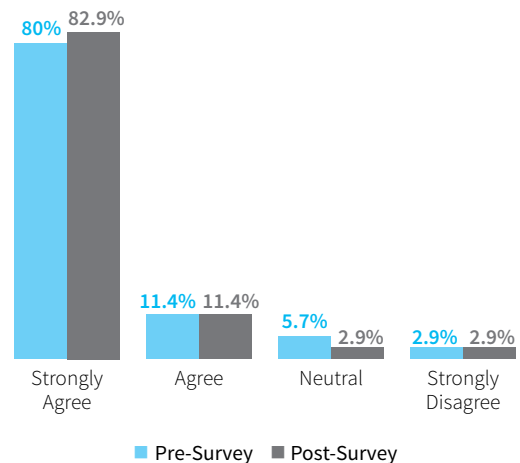
A4.
Getting a concussion while playing sports is really not a big deal - it's just having your bell rung.



A3.
Coaches of organized sports know enough about concussion recognition and management.



A5.
It is my job as a parent to be knowledgeable about concussion recognition and management.



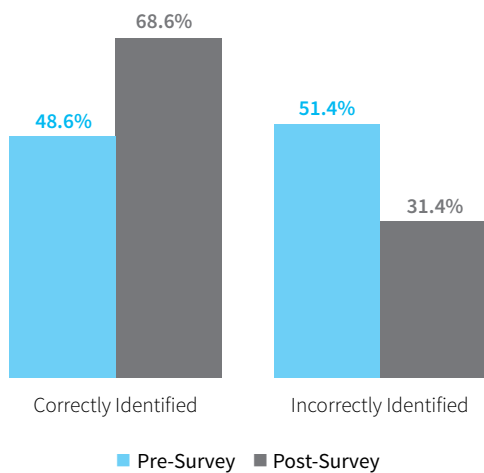
Knowledge

The following section presents the pre- and post-intervention knowledge results (Appendix D).

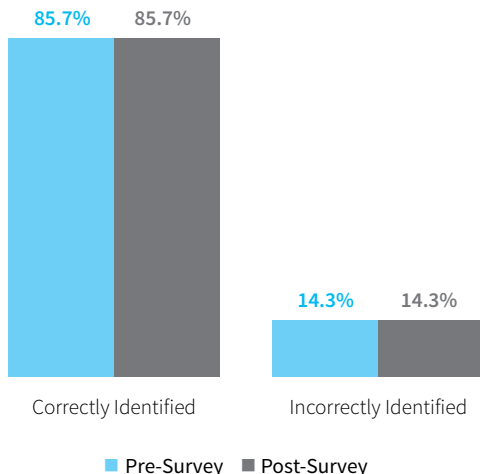
K1: When asked what the coach should do if a player were to be hit hard, yet appear to be fine, a significant difference was seen between the pre- and post-intervention responses. In the pre-intervention survey, 48.6% were able to identify the correct answer while in the post-intervention survey 68.6% correctly identified the answer.

K2: When asked “if your child receives a hard hit during practice or a game but appears to be fine, you should”,

*K1.
If a player receives a hard hit during sports practice or a game but appears to be fine, the coach should: remove the player from the practice/game.*



*K2.
If your child receives a hard hit during soccer/hockey practice or a game but appears to be fine, you should: observe your child for concussion symptoms.*



there was no difference between the pre- and post-intervention survey groups.

K3: Participants were asked to name five symptoms of concussion. The participants received 2 points if their answer was a common symptom, 1 point if their symptom was possible, and 0 for incorrect answers. When comparing data between the pre- and post-intervention surveys, there was an increase in the ability of the participants to correctly state five symptoms of a concussion.

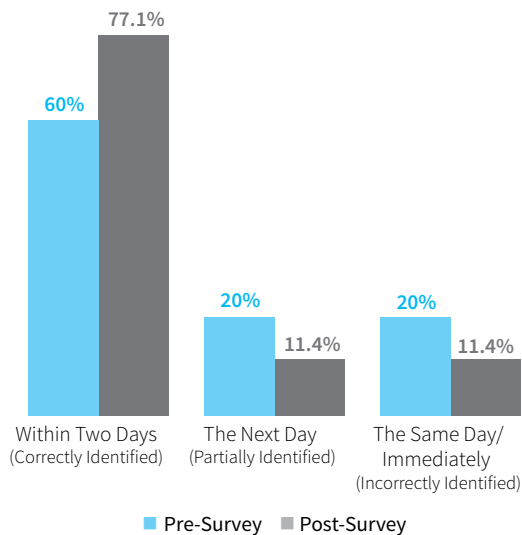
*K3.
Name five symptoms of concussion.*

	Correctly Identified		Incorrectly Identified		Partially Identified	
	Pre-Survey	Post-Survey	Pre-Survey	Post-Survey	Pre-Survey	Post-Survey
Symptom 1	94.3%	97.1%	2.9%	0%	2.9%	2.9%
Symptom 2	91.4%	100%	0%	0%	8.6%	0%
Symptom 3	94.3%	91.4%	5.7%	2.9%	0%	5.7%
Symptom 4	74.3%	94.3%	8.6%	2.9%	17.1%	2.9%
Symptom 5	88.6%	88.6%	0%	8.6%	11.4%	2.9%

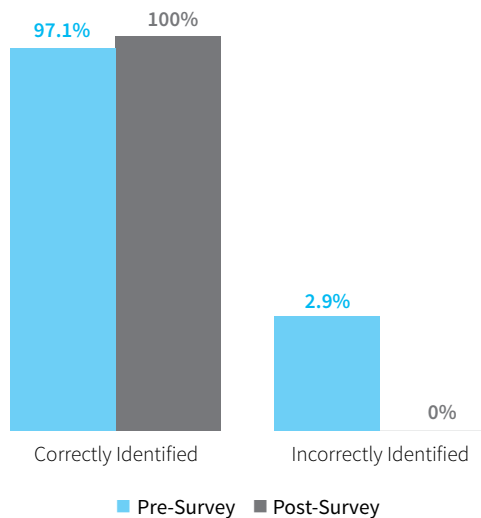
K4: When asked how long it takes for concussion symptoms to appear, 77.1% of participants identified the correct answer in the post-intervention survey as compared to 60% in the pre-intervention survey, representing a significant difference.



K4.
How long can concussion symptoms take to appear?



K5.
Is loss of consciousness required to have a concussion?



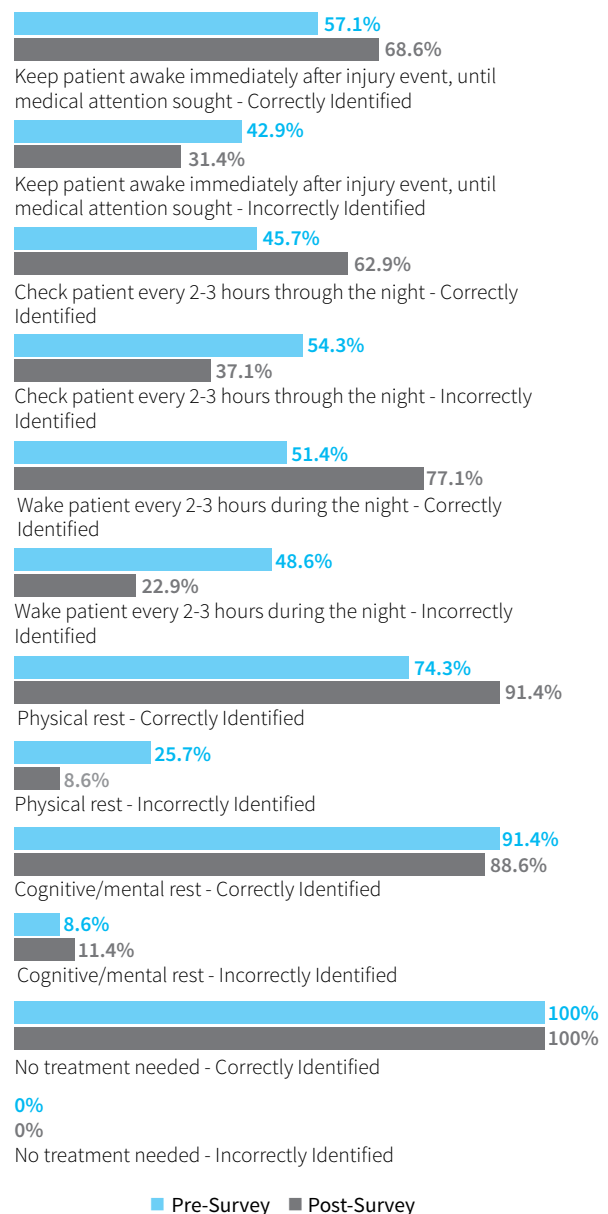
K5: Participants expressed a high level of knowledge for the question “is loss of consciousness required to have a concussion” in both the pre- and post-intervention surveys.

K6: When determining the current recommended components of concussion treatment, participants showed a significant increase in correctly identifying the treatment options in the post-intervention survey:

- Keep patient awake immediately after injury event, until medical attention sought: 68.6% post-survey and 57.1% pre-survey.

- Check patient every 2-3 hours through the night (e.g. normal breathing): 62.9% post-survey and 45.7% pre-survey.
- Wake patient every 2-3 hours during the night: 77.1% post-survey and 51.4% pre-survey.
- Physical rest: 91.4% post-survey and 74.3% pre-survey.
- Cognitive/mental rest: 88.6% post-survey and 91.4% pre-survey.

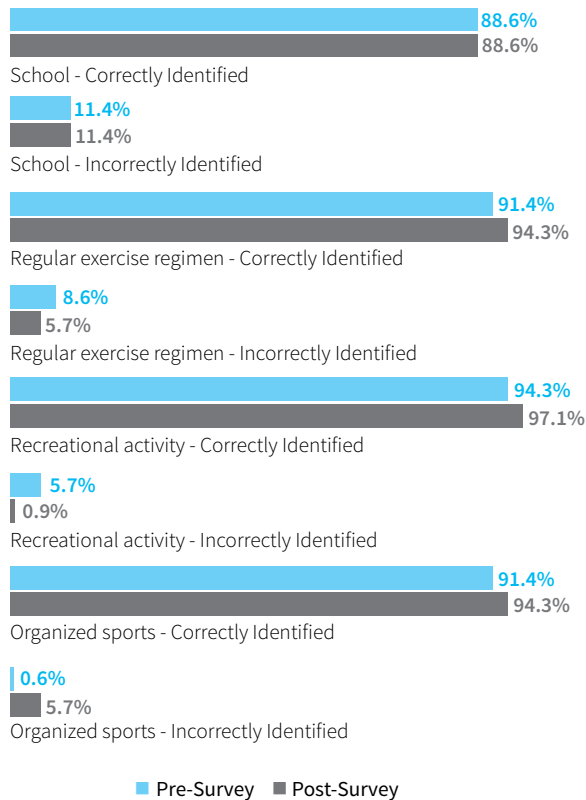
K6.
What are the currently recommended components of concussion treatment?



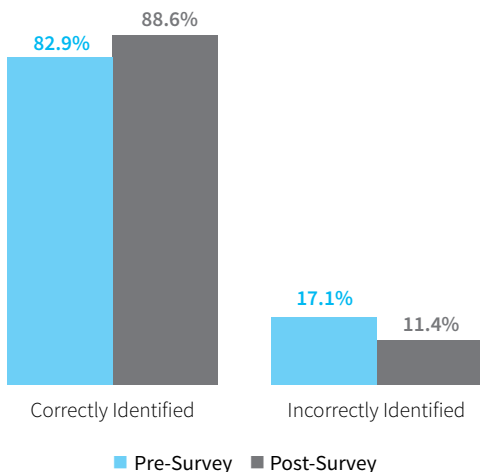
K7: When participants were asked which activities warrant a graduated return after sustaining a concussion, the majority of responses were correctly identified in both pre- and post-intervention surveys, with an increase in the correctly identified answers in the post-intervention responses.



K7.
Which activities warrant a graduated return to after sustaining a concussion?



K8.
When should a player be returned to play?



K8: When participants were asked when a player should be returned to play, the majority of participants chose the correct answer: *after going through a guided return to play program*. Correct responses increased by 5.7% in the post-intervention survey compared to the pre-intervention responses.

Knowledge and Attitude Scores

Summary pre- and post-intervention scores were calculated for each component of knowledge and attitudes. For all participants, mean scores for knowledge were higher for the post-intervention survey compared to the pre-intervention survey; however the attitudes mean score decreased. Among participants who indicated that they had visited CATT, mean scores for both knowledge and attitudes increased.

Pre- and post-intervention knowledge and attitude scores, all participants (n=35)

Knowledge & Attitude	Pre-Intervention		Post-Intervention	
	Mean Score	Standard Deviation	Mean Score	Standard Deviation
Knowledge	81.6	10.9	88.4	7.4
Attitude	89.4	7.1	89.0	10.4

Pre- and post-intervention knowledge and attitude scores, participants who visited CATT (n=23)

Knowledge & Attitude	Pre-Intervention		Post-Intervention	
	Mean Score	Standard Deviation	Mean Score	Standard Deviation
Knowledge	83.0	11.5	90.9	4.6
Attitude	89.9	6.5	91.3	6.8

STATISTICAL ANALYSES

Paired t-test found statistically significant positive changes in knowledge ($p=0.002$) but no significant changes in attitudes ($p=0.857$) among all 35 participants. Among participants who indicated that they had visited CATT, paired t-test also found statistically significant positive changes in knowledge ($p=0.007$) and no significant changes in attitudes ($p=0.357$).

Paired sample t-test for knowledge and attitude, all participants ($n=35$)

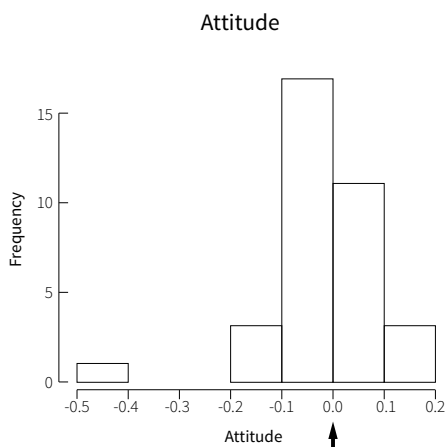
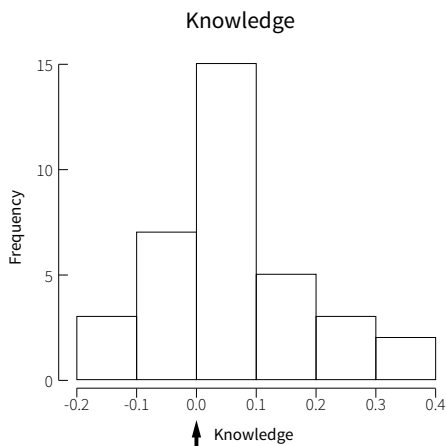
Knowledge & Attitude	Pre-Test	Post-Test	P-value*
Knowledge	81.6	88.4	0.002
Attitude	89.4	89.0	0.857

*statistically significant at $p<0.05$

Paired sample t-test for knowledge and attitude, participants who visited CATT ($n=23$)

Knowledge & Attitude	Pre-Test	Post-Test	P-value*
Knowledge	83.0	90.9	0.007
Attitude	89.9	91.3	0.357

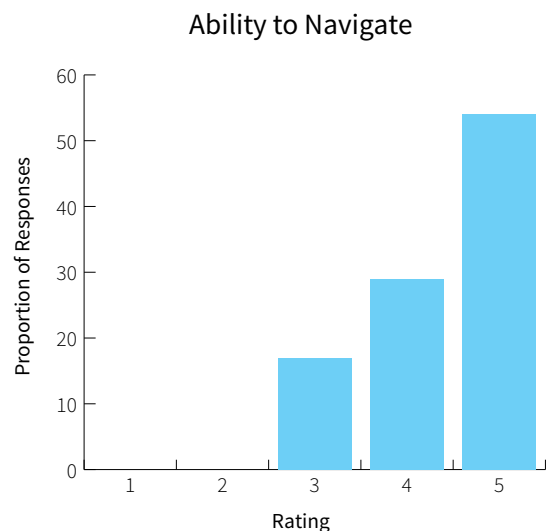
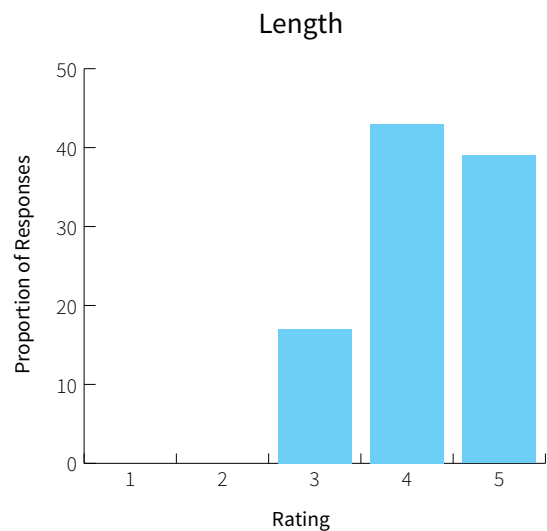
*statistically significant at $p<0.05$



Ratings of CATT for Parents, Players and Coaches

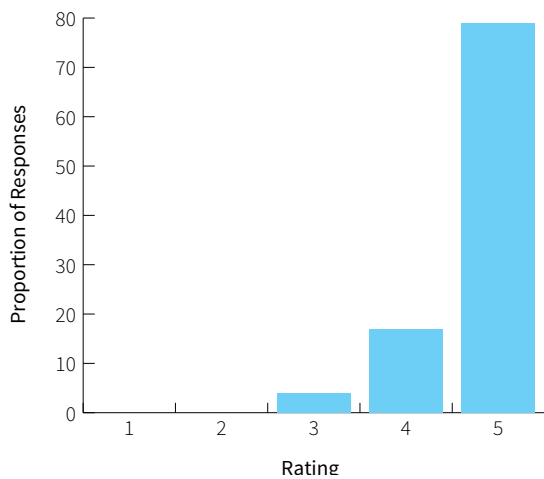
As part of the evaluation, 24 participants offered further feedback on the CATT for Parents, Players and Coaches resource. Participants were asked to rate CATT for length, ability to navigate, ability to understand, appropriate to participants' needs, and content being up-to-date. Participants used a scale of 1 to 5, where 1 was worst and 5 was best.

Combining scores 4 and 5, 82% of participants approved the length of CATT, 83% approved the ability to navigate, 96% approved the ability to understand and the appropriateness, and 100% believed the information is up-to-date.

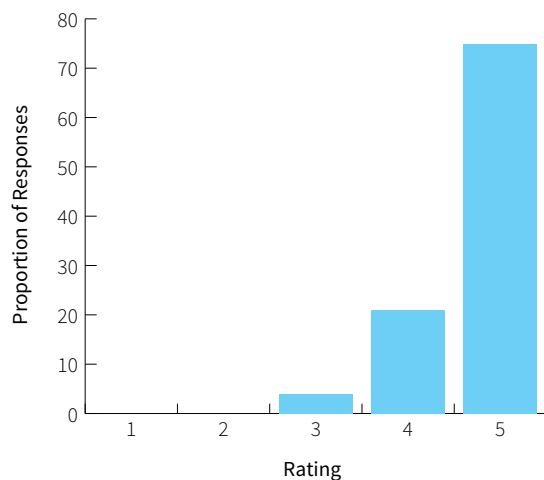




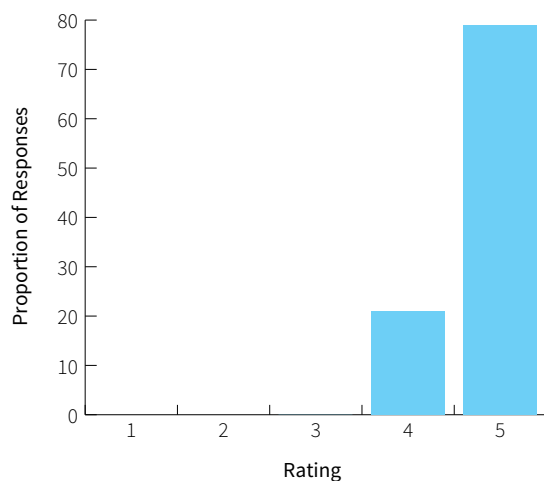
Ability to Understand



Appropriate to Needs



Up to Date



Further feedback offered by the participants included:

- *Informative and easy to use, clear and concise.*
- *Good source of info and I liked the concussion response tool.*
- *Informative, clear, helpful and practical information, relevant info, applicable, related to concussions overall not just sport.*
- *Better understanding and clarification of misinformation.*
- *Extremely informative and a high level resource.*
- *Well explained. Good teaching tool as designed.*
- *Every parent in sports should be aware and have provided to them, schools should provide fact sheets, YES! YES! YES!*
- *So much info all in one place.*
- *It covers a lot of basic information that parent and people in general do not know.*
- *Every parent whose child plays any sports should know this information. This information will prevent many players from lifelong problems if it is known and followed by coaches and parents.*
- *Coaches do not always see or understand since most are volunteers with no training.*
- *I am dealing with the long term affects of a concussion now and this may have helped me. I think it is important that even younger kids have access to this information, even more so as the younger the child the less able they are to communicate what is going on.*
- *Especially liked the page to download for coaches or even parents.*
- *I would like to see info specific to adult concussion as well. Both of my sons have had a concussion and I am currently recovering from one myself. I had no idea what they were going through until now. I thought I did and I thought I was well informed compared to other parents, but this has been difficult and enlightening too.*
- *I thought the resources, especially the questions for doctors, were great and very helpful. It presents a team-based approach which is so valuable and the way it should be – families, doctors, coaches and schools working together. Great work, very effective and educational.*
- *Thank you for creating this information source.*

Discussion

The Concussion Awareness Training Toolkit (CATT) for Parents, Players and Coaches is a new online resource developed in British Columbia, Canada. Based upon established international principles, the aim of CATT is to standardize concussion prevention, awareness and management. CATT provides up-to-date educational training in the form of:

- 32 minute online training video for parents and coaches
- Frequently asked questions for parents
- Concussion videos appropriate for youth
- Printable handouts for parents and coaches
- The Concussion Response Tool for Parents (smartphone accessible and fillable)
- Questions to ask your Doctor Resource
- The Return to Learn Communication Tool for parents and educators
- The Return to Play Communication Tool for parents and coaches

CATT was originally launched April 2013 (www.cattonline.com) with the CATT for Medical Practitioners being the first suite of tools to be launched. CATT for Parents, Players and Coaches was then launched in July 2014. There have been over 7,289 visits to the website between July 1 and February 13, 2014, from a total of 5,251 unique visitors. Visitors viewed an average of 3.7 pages per session and stayed on the site for an average of 2 minutes and 48 seconds. Site visitors were from Vancouver (15.4%), Calgary (10.1%), Surrey (4.5%), Toronto (4.0%) and Edmonton (3.0%), as well as other cities in Canada, the United States, and across Europe and beyond.

CATT for Parents, Players and Coaches is being actively disseminated provincially and nationally via presentations to committees and sports organizations; newsletters and websites; cards distributed at private clinics; posters distributed to sporting organizations, community centers and other locations in the Lower Mainland and through regional health authorities and conference presentations.

Concussion continues to be an under-recognized, -diagnosed and -treated medical condition, requiring both physical and mental rest. It can have both short- and long-term effects of which greatly affect quality of life. By raising awareness of the recognition and management of concussion, long-term effects of concussion can be addressed early and post-concussion syndrome and permanent brain damage may be minimized. The evaluation of CATT PPC has demonstrated a statistically significant change in parent knowledge of concussion following the completion of CATT.

Policy supporting the adoption of CATT among youth sporting organizations will increase good concussion management, potentially reducing related health problems, decreasing the risk of long-term brain damage, and lowering total health care costs among these individuals.

Limitations

The primary limitation of the CATT evaluation study was the recruitment of participants. The study timeline had to be extended in order to meet the recruitment goals. Not only was recruitment challenging, but many participants dropped out of the study before completing the post-intervention survey. The sample size of at least 33 participants was calculated to detect an effect size of 0.5. This small sample size limits the power of the study to detect more moderate changes. As many participants were found to merit high attitude scores at the beginning of the study, the potential to achieve large improvements over the baseline was limited. In the end, a total of 35 participants completed the study, of which 23 reported having visited CATT online.

This was a questionnaire-based study collecting self-reported data from parents of children participating in organized sport. Self-reported data may be biased in terms of the attitude questions, affected by a social bias – answering questions how they believe they should be answered rather than their personal reality.

Finally, the concept of ‘attitude’ is difficult to measure. Were the questions used to solicit the participants’ attitudes towards concussion truly measuring attitude? This survey tool was not tested beyond face validity due to limited resources and the expectation that the questionnaire would not be used beyond the purposes of this evaluation.

Next Steps

- Continue dissemination of CATT for Parents, Players and Coaches.
- Continue dissemination of CATT for Medical Professionals.
- Completion of the third and final suite of tools for Educators.
- Continue to engage in social marketing to raise awareness and knowledge among British Columbians on the severity and consequences of concussion.
- Support the dissemination of British Columbian guidelines for the management of pediatric concussion/mTBI and persistent symptoms.

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Appendix A

E-mail Introduction

Dr. Shelina Babul at the University of British Columbia, Department of Paediatrics is leading an evaluation of the new *On-line Concussion Awareness Training Toolkit for Parents, Players and Coaches (CATT PPC)*. This research study seeks to evaluate this new resource.

The study consist of two on-line surveys, as well as access to CATT PPC, with a total time commitment of approximately 40-60 minutes (10 min pre-survey, 20-40 min Toolkit, 10 min post-survey).

All participants who complete the study will be entered into a draw for an iPad Mini.

All responses will be kept confidential and data will only be presented as summary statistics.

Please follow this link to the FluidSurveys for the Online Consent Form & Registration Page and the Pre-Intervention Survey [insert link here].

Please carefully read the study information. By completing the survey, you are consenting to participate in the study.

To register, you will be asked for your e-mail address and to create your own unique study number using your initials, the year you graduated high school, and your oldest child's initials. You will be prompted to re-enter this unique identifier at the beginning of both the pre-intervention survey and the post-intervention survey to support data analysis.

You will be sent a link to CATT PPC in May 2014.

Approximately 3 months following access to CATT PPC, you will receive an e-mail inviting you to complete the second survey. Reminders will be sent at one week intervals if you have not completed the second survey.

If you have any questions about this study please contact the Project Coordinator Kate Turcotte at kturcotte@cw.bc.ca

Thank you very much for your consideration.

Appendix B

On-line Consent & Registration

Dr. Shelina Babul at the University of British Columbia, Department of Paediatrics is leading an evaluation of the new *On-line Concussion Awareness Training Toolkit for Parents, Players and Coaches (CATT PPC)*.

The study consists of two on-line surveys, as well as access to CATT PPC, with a total time commitment of approximately 40-60 minutes (10 min pre-survey, 20-40 min Toolkit, 10 min post-survey).

There are no known risks or harms to participating in this research. Your legal rights against the investigators or anyone else are in no way limited by agreeing to participate in this study.

Possible benefits include improvement of concussion awareness, recognition and management understanding and practices among participants. Long-term benefits include a standardized approach to concussion management and treatment. You may see no direct benefit from participation in this study.

Participants who complete the study will be entered into a draw for an iPad Mini.

All information collected will be securely stored at the BC Injury Research and Prevention Unit for at least five years after the study is finished.

Your confidentiality will be respected. No information that discloses your identity will be released or published. Research records may be inspected in the presence of the Investigator or his or her designate by representatives of the UBC Research Ethics Boards for the purpose of monitoring the research. No records which identify you by name or initials will be allowed to leave the Investigators' offices.

No reason needs to be provided if you decide not to participate in this evaluation. You may withdraw from the study at any time without penalty of any sort. Any survey data you have contributed will be destroyed at your request.

Consent to Participate:

- *I have read and understood the subject information and consent form.*
- *I have had sufficient time to consider the information provided and to ask for advice if necessary.*
- *I have had the opportunity to ask questions and have had satisfactory responses to my questions.*
- *I understand that all of the information collected will be kept confidential and that the result will only be used for scientific objectives.*
- *I understand that my participation in this study is voluntary and that I am completely free to refuse to participate or to withdraw from this study at any time without changing in any way the quality of care that I receive.*
- *I understand that I am not waiving any of my legal rights as a result of signing this consent form.*
- *I understand that there is no guarantee that this study will provide any benefits to me.*
- *I have read this form and I freely consent to participate in this study.*

By completing the survey, you are consenting to be in the study.

Please Note:

- Your e-mail address will be kept confidential and used only to provide you with the link to CATT PPC and the post-intervention survey.
- Your ID number will only be used to link the pre-intervention survey and the post-intervention survey for analysis. No attempts will be made to de-code your study ID number, and this number will be securely stored and kept confidential.

Please enter your e-mail address:

Please re-enter your e-mail address:

Please create your own unique study ID number by entering the following information:

Your initials (2 letters) - XX

The year your youngest child was born (4 numbers) - xx

Your oldest child's initials (2 letters) - xx

You will be asked to re-enter this unique study ID at the beginning of the pre-intervention survey and the post-intervention survey to support data analysis.

Appendix B continued...

Thank you for registering to participate in the evaluation of the On-line Concussion Awareness Training Toolkit for Parents, Players and Coaches. Please click “next” to enter the pre-intervention survey.

If you have any questions about this study, please contact Kate Turcotte, Project Coordinator, at kturcotte@cw.bc.ca.

If you have any concerns about your rights as a research subject and/or your experiences while participating in this study, please contact the Research Subject Information Line in the University of British Columbia Office of Research Services at RSIL@ors.ubc.ca or 604-822-8598 (Toll Free number 1-877-822-8598).

Appendix C

Pre/Post-Intervention Survey

ATTITUDE

Please answer the following questions on a scale of 1 to 5, where 1 indicates disagreement with the statement and 5 indicates agreement with the statement.

1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree

1. Concussion could be a significant threat to my child's health. [Insert scale] (Score = 1-5)
2. Parents with children in organized sports already understand about concussion and what to do. [Insert scale] (Score = Reverse Scale 1-5)
3. Coaches of organized sports know enough about concussion recognition and management. [Insert scale] (Score = Reverse scale 1-5)
4. Getting a concussion while playing sports is really not a big deal – it's just having your bell rung. [Insert scale] (Score = Reverse Scale 1-5)
5. It is my job as a parent to be knowledgeable about concussion recognition and management. [Insert scale] (Score = 1-5)

KNOWLEDGE

1. If a player receives a hard hit during sports practice or a game but appears to be fine, the **COACH** should: (please pick best answer – one answer only)
 - Ask if he/she is alright (= 0)
 - Remove the player from the practice/game (=2)
 - Inform the parent at the end of the practice/game (=0)
2. If **YOUR** child receives a hard hit during soccer/hockey practice or a game but appears to be fine, **YOU** should: (please pick best answer – one answer only)
 - Ask if he/she is alright (= 0)
 - Ask the coach if your child is alright (= 0)
 - Observe your child for concussion symptoms (= 2)
 - Take your child immediately to the emergency department (= 0)
3. Name 5 symptoms of concussion? (Score based on text answer provided, if any)
 1. [Text box]
 2. [Text box]
 3. [Text box]
 4. [Text box]
 5. [Text box]
4. How long can concussion symptoms take to appear?
 - Immediately (=0)
 - Same day (=0)
 - Next day (=1)
 - Within two days (=2)

Appendix C continued...

5. Is loss of consciousness required to have a concussion? Yes / No (Yes=0; No = 2)
6. What are the currently recommended components of concussion treatment?
Select all that apply:
- Keep patient awake immediately after injury event, until medical attention sought Yes / No (Yes=2; No = 0)
 - Check patient every 2-3 hours during the night (e.g. normal breathing) Yes / No (Yes=2; No = 0)
 - Wake patient every 2-3 hours during the night Yes / No (Yes=0; No = 2)
 - Physical rest Yes / No (Yes=2; No = 0)
 - Cognitive/mental rest Yes / No (Yes=2; No = 0)
 - No treatment needed Yes / No (Yes=0; No = 2)
7. Which activities warrant a graduated return to after sustaining a concussion?
- School Yes / No (Yes=2; No = 0)
 - Regular exercise regimen Yes / No (Yes=2; No = 0)
 - Recreational activity Yes / No (Yes=2; No = 0)
 - Organized sports Yes / No (Yes=2; No = 0)
8. When should a player be returned to play?
- As soon as they report feeling better Yes / No (Yes=0; No = 2)
 - When symptoms have resolved Yes / No (Yes=0; No = 2)
 - When the coach says so Yes / No (Yes=0; No = 2)
 - After going through a guided return-to-play program Yes / No (Yes=2; No = 0)

PRE-SURVEY ONLY

DEMOGRAPHICS (Not scored)

1. Is at least one of your children currently registered in an organized sport in BC? Yes / No
2. Have any of your children suffered a suspected or confirmed concussion? Yes / No
3. Do you have any experience with concussion? Yes / No
[If yes] Please describe: [Text box]
4. Are you: Male or Female
5. Which age group do you belong to?
 - 15-24 years
 - 25-44 years
 - 45-64 years
 - 65+ years
6. Does your family have a Family Doctor? Yes / No
7. What is the primary language spoken in your home? _____
8. What is your highest level of education?
 - <High School
 - High School
 - College Diploma
 - Bachelor Degree
 - Masters Degree
 - Other _____

Appendix C continued...

9. Can you estimate your household income?

<\$20,000

\$20,000-39,000

\$40,000-59,000

\$60,000-79,000

>\$80,000

POST-SURVEY ONLY

OTHER COMMENTS

1. Did you visit CATT for Parent, Players and Coaches? (Not scored) Yes / No

[If Yes]

2. Did you find CATT to be a useful resource? Yes / No (Yes = 2; No = 0)

Please explain [Text Box]

3. Did the information presented make sense to you? (Yes = 2; No = 0)

Yes

No: Please explain [Text Box]

4. Please rate the following Toolkit qualities on a scale of 0 to 5, where 0 is the worst and 5 is the best: **(Score = 1-5)**

Length

Ability to navigate

Ability to understand

Appropriate to your needs

Up-to-date information

5. Would you recommend this resource to other parents? Yes / No / Maybe (Yes = 2; Maybe = 1, No = 0)

Please explain [Text Box]

6. Do you have any other comments about CATT? (Not scored)

[Text Box]

Thank you for taking our survey. Your participation is very important to us.

Appendix D

Results Tables: Attitudes & Knowledge

Attitude Questions (n=35)

Question	Pre-Survey	Post-Survey
1. Concussion could be a significant threat to my child's health.	20% Agree 80% Strongly Agree	2.9% Strongly Disagree 8.6% Agree 88.6% Strongly Agree
2. Parents with children in organized sports already understand about concussions and what to do.	5.7% Agree 8.6% Neutral 57.1% Disagree 28.6% Strongly Disagree	2.9% Strongly Agree 2.9% Agree 14.3% Neutral 51.4% Disagree 28.6% Strongly Disagree
3. Coaches of organized sports know enough about concussion recognition and management.	5.7% Agree 8.6% Neutral 48.6% Disagree 37.1% Strongly Disagree	2.9% Strongly Agree 2.9% Agree 14.3% Neutral 51.4% Disagree 28.6% Strongly Disagree
4. Getting a concussion while playing sports is really not a big deal – it's just having your bell rung.	5.7% Strongly Agree 2.9% Agree 5.7% Disagree 85.7% Strongly Disagree	2.9% Strongly Agree 2.9% Neutral 8.6% Disagree 85.7% Strongly Disagree
5. It is my job as a parent to be knowledgeable about concussion recognition and management.	2.9% Strongly Disagree 5.7% Neutral 11.4% Agree 80% Strongly Agree	2.9% Strongly Disagree 2.9% Neutral 11.4% Agree 82.9% Strongly Agree

Knowledge Questions (n=35)

Question	Pre-Survey	Post-Survey
1. If a player receives a hard hit during sports practice or a game, but appears to be fine, the coach should: <ul style="list-style-type: none"> Ask if he/she is alright Remove the player from the practice/game Inform the parent at the end of the practice/game 	51.4% Answered Incorrectly 48.6% Answered Correctly	31.4% Answered Incorrectly 68.6% Answered Correctly
2. If your child receives a hard hit during soccer/hockey practice or a game, but appears to be fine, you should: <ul style="list-style-type: none"> Ask if he/she is alright Ask the coach if your child is alright Observe your child for concussion symptoms Take your child immediately to the emergency department 	14.3% Answered Incorrectly 85.7% Answered Correctly	14.3% Answered Incorrectly 85.7% Answered Correctly

Appendix D continued...

3. Name Five Symptoms of Concussion

Symptoms

- Symptom 1
- Symptom 2
- Symptom 3
- Symptom 4
- Symptom 5

Pre-Survey		
Correctly Identified	Incorrectly Identified	Partially Identified
94.3%	2.9%	2.9%
91.4%	0%	8.6%
94.3%	5.7%	0%
74.3%	8.6%	17.1%
88.6%	0%	11.4%

Post-Survey		
Correctly Identified	Incorrectly Identified	Partially Identified
97.1%	0%	2.9%
100%	0%	0%
91.4%	2.9%	5.7%
94.3%	2.9%	2.9%
88.6%	8.6%	2.9%

4. How long can concussion symptoms take to appear?

20% Answered Same Day/
Immediately – Incorrect
20% Answered Next Day – Partially Correct
60% Answered within 2 Days – Correct

11.4% Answered Same Day/
Immediately – Incorrect
11.4% Answered Next Day – Partially Correct
77.1% Answered within 2 Days – Correct

5. Is loss of consciousness required to have a concussion?

2.9% Answered Incorrectly
97.1% Answered Correctly

0% Answered Incorrectly
100% Answered Correctly

6. What are the currently recommended components of concussion treatment?

Recommendations

- Keep patient awake immediately after injury event, until medical attention sought
- Check patient every 2-3 hours through the night (e.g. normal breathing)
- Wake patient every 2-3 hours during the night
- Physical rest
- Cognitive/mental rest
- No treatment needed

Pre-Survey	
Correctly Identified	Incorrectly Identified
57.1%	42.9%
45.7%	54.3%
51.4%	48.6%
74.3%	25.7%
91.4%	8.6%
100%	0%

Post-Survey	
Correctly Identified	Incorrectly Identified
68.6%	31.4%
62.9%	37.1%
77.1%	22.9%
91.4%	8.6%
88.6%	11.4%
100%	0%

7. Which activities warrant a graduated return to after sustaining a concussion?

Activities

- School
- Regular exercise regimen
- Recreational activity
- Organized sports

Pre-Survey	
Correctly Identified	Incorrectly Identified
88.6%	11.4%
91.4%	8.6%
94.3%	5.7%
91.4%	8.6%

Post-Survey	
Correctly Identified	Incorrectly Identified
88.6%	11.4%
94.3%	5.7%
97.1%	2.9%
94.3%	5.7%

8. When should a player be returned to play?

Correct Recommendations

- After going through a guided return-to-play program

Pre-Survey	
Correctly Identified	Incorrectly Identified
82.9%	17.1%

Post-Survey	
Correctly Identified	Incorrectly Identified
88.6%	11.4%