

A retrospective evaluation of pediatric major trauma related to sport and recreational activities in Nova Scotia

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Background



- At least one third of all pediatric injuries in Canada are related to sports.
- Hockey injuries account for 10% of all pediatric injuries.



Background

- Head injuries from sports are particularly concerning due to the risk of traumatic brain injury (TBI).

Hockey Canada votes to ban bodychecking in peewee hockey

Hitting taken out of the game for players under 13

CBC Sports Posted: May 25, 2013 1:01 PM ET | Last Updated: May 25, 2013 8:07 PM ET

May 12, 2013



Most sports-related brain injuries occur in hockey, study finds

CARLY WEEKS

The Globe and Mail

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through 18), with only one dissenting vote of the 21-member board.

Background

Mechanisms of Team-Sport-Related Brain Injuries in Children 5 to 19 Years Old: Opportunities for Prevention

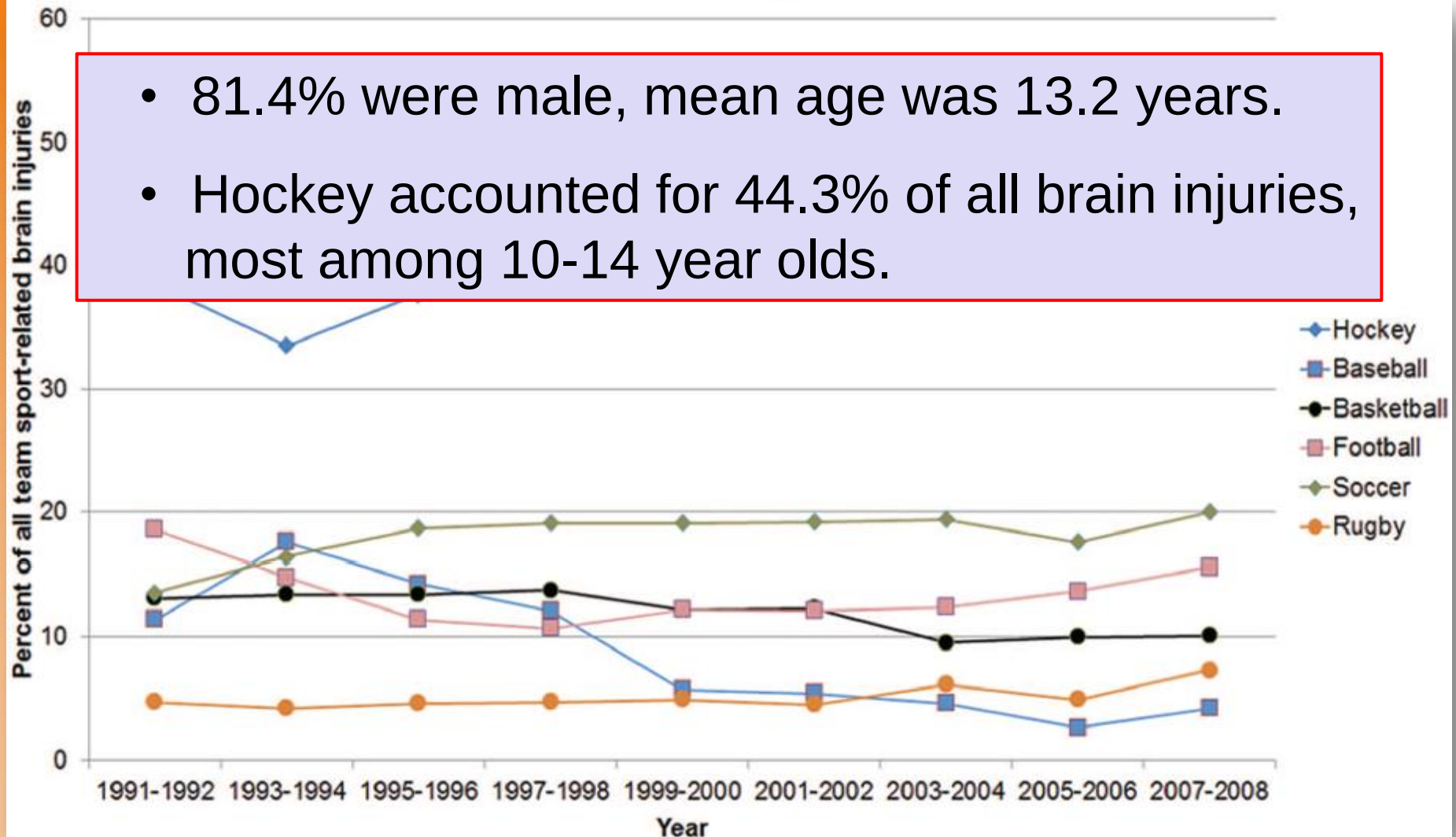
Michael D. Cusimano^{1,2*}, Newton Cho¹, Khizer Amin¹, Mariam Shirazi¹, Steven R. McFaull³, Minh T. Do³, Matthew C. Wong¹, Kelly Russell¹

¹ Injury Prevention Research Office, St. Michael's Hospital, University of Toronto, Toronto, Canada, ² Division of Neurosurgery, St. Michael's Hospital, University of Toronto, Toronto, Canada, ³ Health Surveillance and Epidemiology Division, Public Health Agency of Canada, Ottawa, Canada

- Retrospective case series (1990-2009).
- Searched the CHIRPP database for brain injury cases among 5-19 year olds playing ice hockey, soccer, football, basketball, baseball, or rugby.
- Identified 12,799 brain injuries (minor closed head injury, concussion, or intracranial injury).

Background

- 81.4% were male, mean age was 13.2 years.
- Hockey accounted for 44.3% of all brain injuries, most among 10-14 year olds.



Background

RESEARCH ARTICLE

Open Access

Epidemiology of sports-related injuries in children and youth presenting to Canadian emergency departments from 2007–2010

Liraz Fridman^{1*†}, Jessica L Fraser-Thomas^{1†}, Steven R McFaull^{2†} and Alison K Macpherson^{1†}

- Retrospective case series over 3 year period.
- Searched the CHIRPP database for injury cases among 5-19 year olds playing 13 sports (baseball, basketball, cycling, football, ice hockey, lacrosse, ringette, rugby, skiing, sledding, snowboarding, soccer, or volleyball).
- Identified 56,691 sports and recreational injuries.

Source: Fridman L, et al. Epidemiology of Sports-Related Injuries in Children and Youth Presenting to Canadian Emergency Departments from 2007-2010. BMC Sports Science, Medicine and Rehabilitation. 2013;5(1):30. doi: 10.1186/2052-1847-5-30.

Background

- 71.1% were male, most injuries were in the 10-14 year age group (56.6%).
- Soccer accounted for the most sports-related injuries, followed by ice hockey and cycling.

Football	6,141 (10.8)	388 (0.5)	5,072 (59.8)	2,061 (33.9)	91.7
Snowboarding	3,194 (5.6)	153 (4.8)	2,021 (63.3)	1,020 (31.9)	73.5
Skiing	1,970 (3.5)	470 (23.9)	1,108 (56.2)	392 (19.9)	58.4
Sledding	1,793 (3.2)	861 (48.0)	821 (45.79)	111 (6.2)	56.1
Rugby	1,651 (2.9)	8 (0.5)	376 (22.8)	1,267 (76.7)	68.4
Baseball	1,633 (2.9)	271 (16.6)	949 (58.1)	413 (25.3)	70.7
Volleyball	1,505 (2.7)	43 (2.9)	873 (58.0)	589 (39.1)	37.3
Lacrosse	493 (0.1)	26 (5.3)	291 (59.0)	176 (35.7)	85.0
Ringette	324 (0.1)	29 (9.0)	210 (64.8)	85 (26.2)	2.5

Source: Fridman L, et al. Epidemiology of Sports-Related Injuries in Children and Youth Presenting to Canadian Emergency Departments from 2007-2010. BMC Sports Science, Medicine and Rehabilitation. 2013;5(1):30. doi: 10.1186/2052-1847-5-30.

Background

Study Rationale

- It is unknown which sports in Nova Scotia lead to the most major traumas, including traumatic brain injury. A better understanding of sport-specific injury risk is needed in NS.
- Analyzing past trends in sport-related injuries can identify high-risk groups and be used to inform future research priorities and injury prevention strategies for the province.

Background

Objective

To describe overall patterns of pediatric sport-related major traumas seen in NS between 2000 and 2013.

Hypothesis

Hockey is the most common cause of sport-related major trauma for pediatric patients in Nova Scotia.

Methodology

- This study was a retrospective case series.
- Data on sport-related major trauma in patients (age < 19 years) was extracted from the NSTP Registry between 2000-2013 using CIHI Sport & Recreation Incident Codes.
- We assessed the following:
 - frequency and severity of injuries
 - admission to a special care unit (SCU)
 - severe TBI (AIS-90 Head score ≥ 3)
 - length of stay in-hospital
 - mortality

NSTP Registry

NSTR

- Used to collect/analyze information on injuries.
- 12,000+ major trauma cases since October 1994.

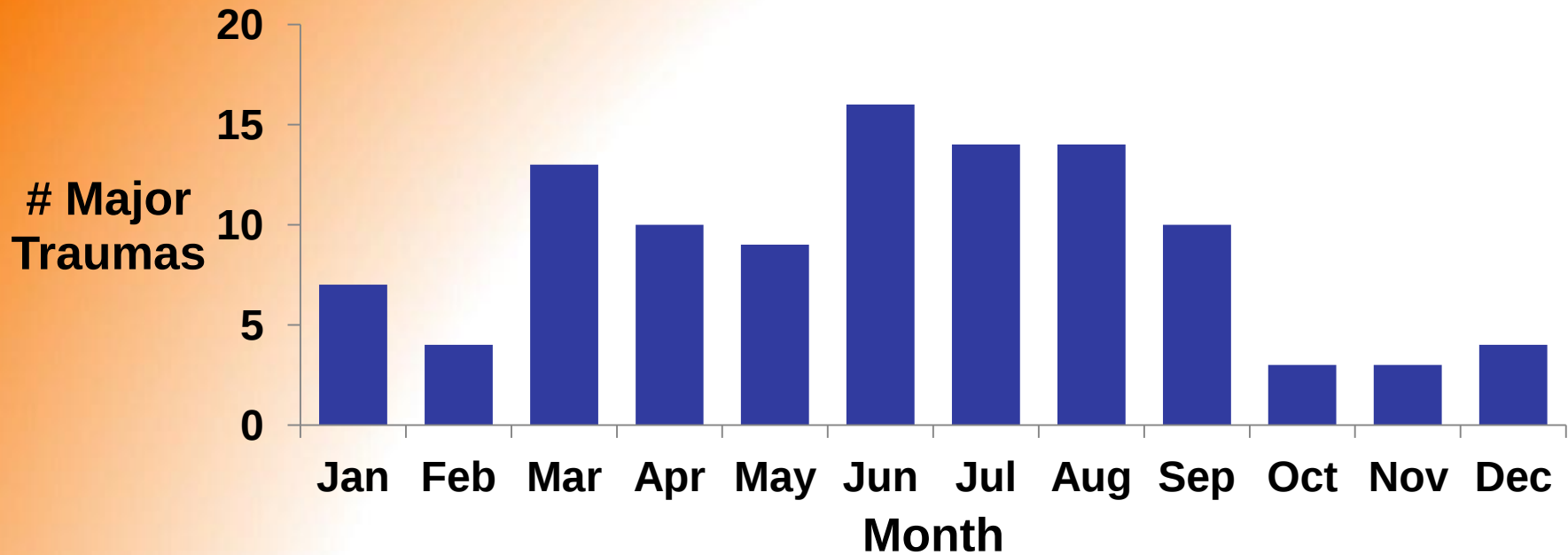
NSTP definition of “major trauma”

- Injury resulting from the transfer of energy (e.g. kinetic, thermal) with an Injury Severity Score (ISS) > 12 and an appropriate ICD External Cause of Injury Code.
- Penetrating injury cases with an ISS ≥ 9 are included.
- Drownings, hangings, suffocations, and asphyxias were included starting in April 2011.

Results

- 9471 records were accessed between 2000-2013.
- During the 13-year study period, there were 1177 pediatric major traumas.
 - 107 (9%) were sport-related
 - Patients were aged 3-18 years
 - 84% of patients were male

Results



Season	Summer (21 Jun - 20 Sep)	Spring (21 Mar - 20 Jun)	Winter (21 Dec - 20 Mar)	Autumn (21 Sep - 20 Dec)
Traumas (%)	38	32	21	9

**Distribution of pediatric sport-related major trauma
by month and season**

Results

Age	Total	Male	Female
3-6	2.5	3.6	1.3
7-10	3.4	4.7	1.9
11-14	6.7	11.9	1.4
15-18	5.8	9.8	1.6
All ages (3-18)	4.7	7.8	1.5

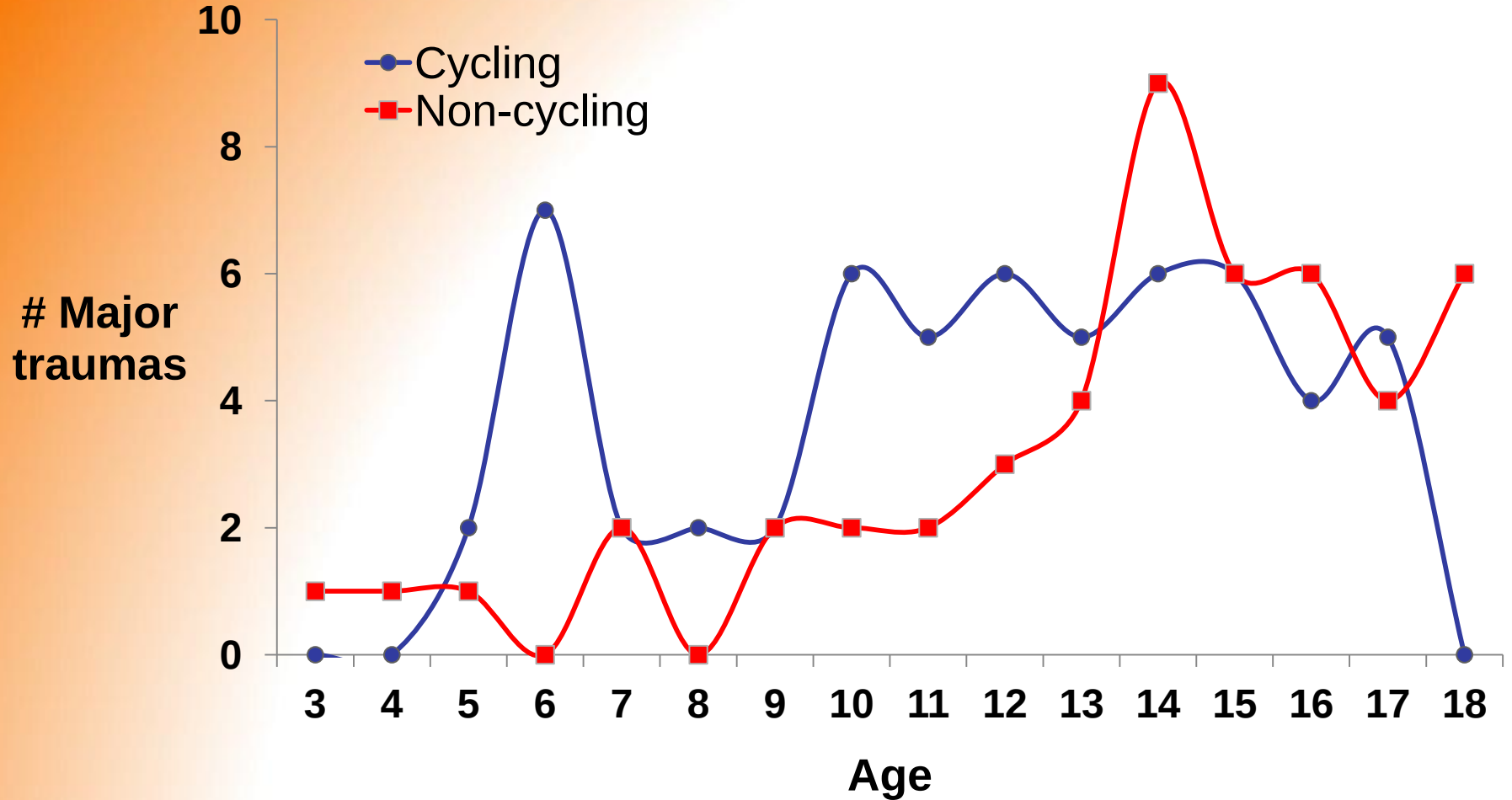
**Age-specific rate of sport-related major trauma
per 100,000 pediatric population**

Results

Sport (<i>N</i> = 107)	Total, <i>n</i>	Males, % of <i>n</i>	Mean age (SD)	Mean GCS (SD)	Mean ISS (SD)	Helmet worn, % of <i>n</i>
Cycling	63	81	11.7 (3.6)	12.9 (3.5)	16.2 (10.1)	36
Hockey	9	100	14.4 (2.7)	10.0 (7.1)	18.3 (6.9)	100
Skateboarding	8	100	13.0 (4.2)	9.5 (5.5)	26.0 (14.1)	43
Skiing	7	86	14.9 (3.2)	12.3 (3.7)	15.6 (6.7)	57
Swimming	5	40	11.4 (5.9)	8.7 (6.7)	19.3 (4.9)	n/a

**Characteristics and severity of pediatric major trauma
by type of activity**

Results



Pediatric major trauma from cycling versus other activities

Results

Sport	Total, <i>n</i>	SCU admissions, % of <i>n</i>	Mean days in-hospital (SD)	TBI, % of <i>n</i>	Mortality (%)
Cycling	63	41	4.3 (4.3)	54	< 5
Hockey	9	67	4.0 (2.2)	33	0
Skateboarding	8	43	10.7 (13.6)	43	< 5
Skiing	7	71	7.7 (8.1)	43	0
Swimming	5	80	4.0 (1.6)	40	< 5

Outcomes of pediatric sport-related major traumas

In keeping with NS Department of Health & Wellness privacy policy, counts between 1-4 are reported as “*n* < 5”.

Discussion

- Pediatric major trauma related to sport and recreational activity is relatively infrequent in Nova Scotia with 107 cases recorded over a 13-year period, accounting for 9% of all pediatric major traumas during this time.
- Contrary to our hypothesis, hockey was not the most common sport resulting in major trauma.
 - cycling (59%)
 - hockey (8%)
 - skateboarding (7%)

Discussion

TBI and pediatric sports

- Overall, TBI occurred in over half of all pediatric major trauma patients.
 - 30% of hockey-related major traumas
 - despite 100% reported helmet use
- Cycling was responsible for the most cases of severe traumatic brain injury.
 - 36% helmet use

Discussion

Study Limitations

- Observational study, causality cannot be inferred.
- The total number of youth participating in each sport was unavailable.
- Individuals treated in an ED for injury and discharged without being admitted are not included in the NSTR unless a Trauma Team was activated.
- Data was not available for position played, experience level, or presence of coaches/referees.

Conclusions

- Cycling is the largest contributor, followed by hockey, in Nova Scotia.
- Changes to minor hockey may not significantly impact the incidence of major trauma.



Conclusions

- Though injury can be an unintended consequence of playing sports, participating in sports has many positive effects on the health of youth.
- Supporting efforts for the prevention of sport-related injuries has the potential to greatly reduce the number of injuries in children and adolescents.

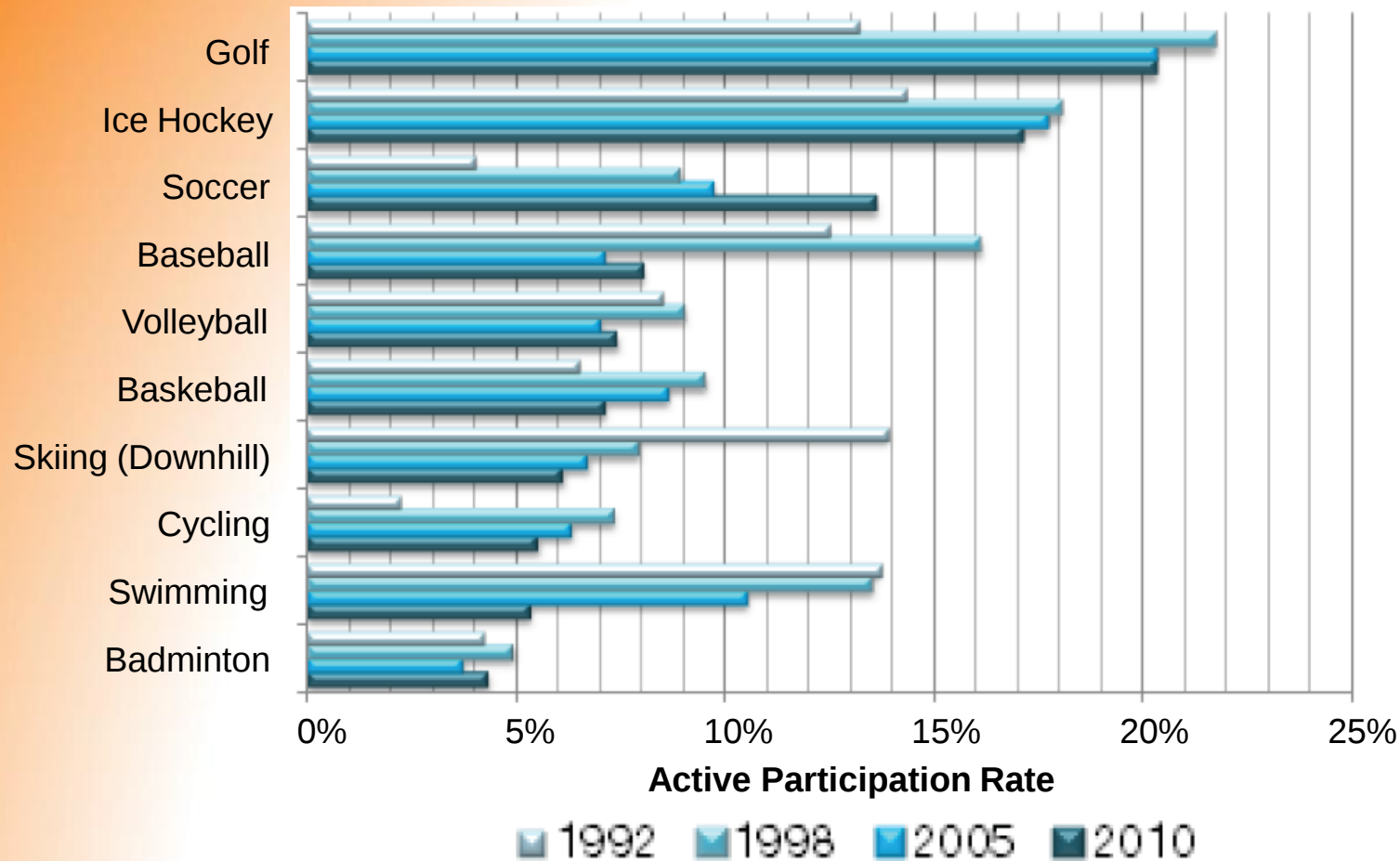


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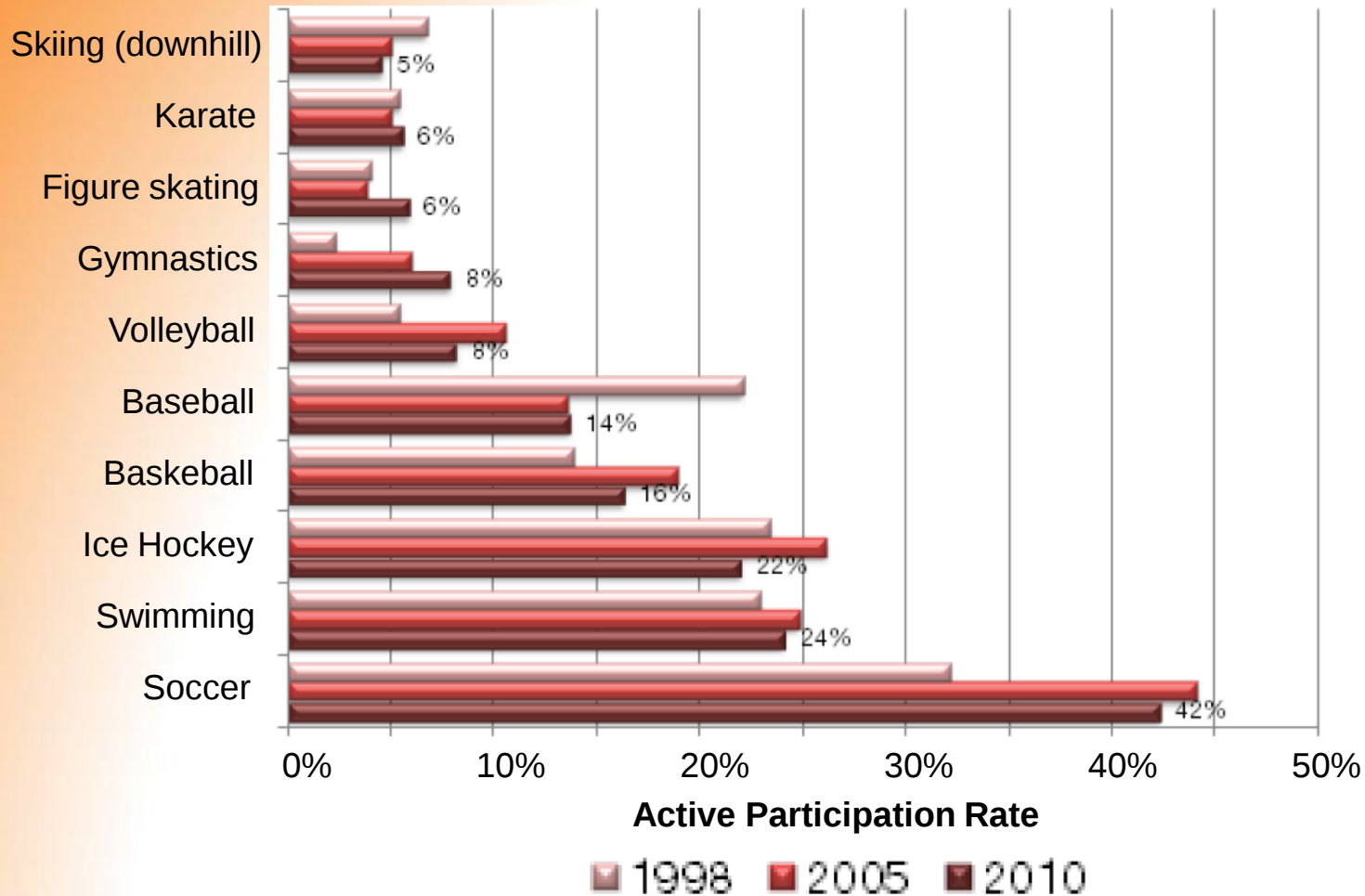
NSTP Staff

Canadian participation rates (ages 15+) in the top ten sports



Source: Canadian Heritage Sport Participation 2010. June 2013. Available at:
http://www.sirc.ca/online_resources/documents/SportParticipation%20Report%202013_EN_VF.pdf

Canadian participation rates (ages 5-14) in the top ten sports



Source: Canadian Heritage Sport Participation 2010. June 2013. Available at:
http://www.sirc.ca/online_resources/documents/SportParticipation%20Report%202013_EN_VF.pdf

Methodology

Sport	CIHI Sports/Rec Incident Code
Badminton	7
Baseball	8
Basketball	9
Boxing (organized)	20
Curling	24
Cycling (Driver)	25
Cycling (Passenger)	26
Diving	31
Football	37
Golf	39
Gymnastics (Organized)	40
Handball	41
Hockey (Ice)	45
Hockey (Street/ball)	46
Hockey (Field/floor)	47
Hockey (Inline)	48
Lacrosse	54

Sport	CIHI Sports/Rec Incident Code
Raquetball	61
Ringette	62
Rugby	63
Skate Boarding	67
Skiing - Downhill (Recreational)	71
Skiing - Downhill (Racing)	72
Skiing - Cross Country	73
Skijumping	74
Snowboarding	76
Soccer	80
Squash	81
Swimming (Pool)	82
Tennis	85
Track & Field (Organized)	87
Volleyball	89
Waterpolo	91
Wrestling (Organized)	94