

HELMET SAFETY: CYCLE, SKATE, SKI



ACIP

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NS

OUTLINE

- What works in Injury Prevention
- Collaborative effort for Injury Prevention around helmets in NS
- Helmets for wheeled activities
- Review of legislations in NS
- Skating
- Skiing
- Future implications of research
- Strategic planning around helmets in NS

WHAT WORKS IN INJURY PREVENTION?

Injury Prevention Strategies	Health Promotion Strategies
<ul style="list-style-type: none">• Education• Enforcement• Engineering	<ul style="list-style-type: none">• Developing personal skills• Healthy public policy• Supportive environments• Strengthening community action• Reorienting health and other services

- These concepts in Injury prevention and health promotion share much in common.
- A combination of these strategies is essential to preventing injuries.
- These strategies must always consider and address root causes and reduce disparities in health status.
- The safe behaviour must be the easy choice.
- Changing the behaviour of children and youth requires us to change the *adult* environment in which they live.

WHEELED ACTIVITIES

History

- Bike helmets (1997)
- Other wheels (2002)
- Closure of loopholes (2007)

Why does NS have legislation?

- Political environment and strong stakeholder support was key
- Little to no political opposition
- Minority governments and political cooperation

WHEELED ACTIVITIES

Next Steps

- Continue and expand a combined enforcement and education approach

Wheeled Activities

Helmet Use and Legislation

- **The effect of police enforcement on helmet use in an urban and a rural community in Nova Scotia**

INTRODUCTION

- Bicycling-related injuries in Canada per year
 - mean of 4,476 hospital admissions
 - 36 in-hospital deaths

Canadian Institute for Health Information (2004)

- In 2001-02, cycling injuries were estimated to result in direct and indirect costs of almost \$175 million

Canadian Institute for Health Information (2004)

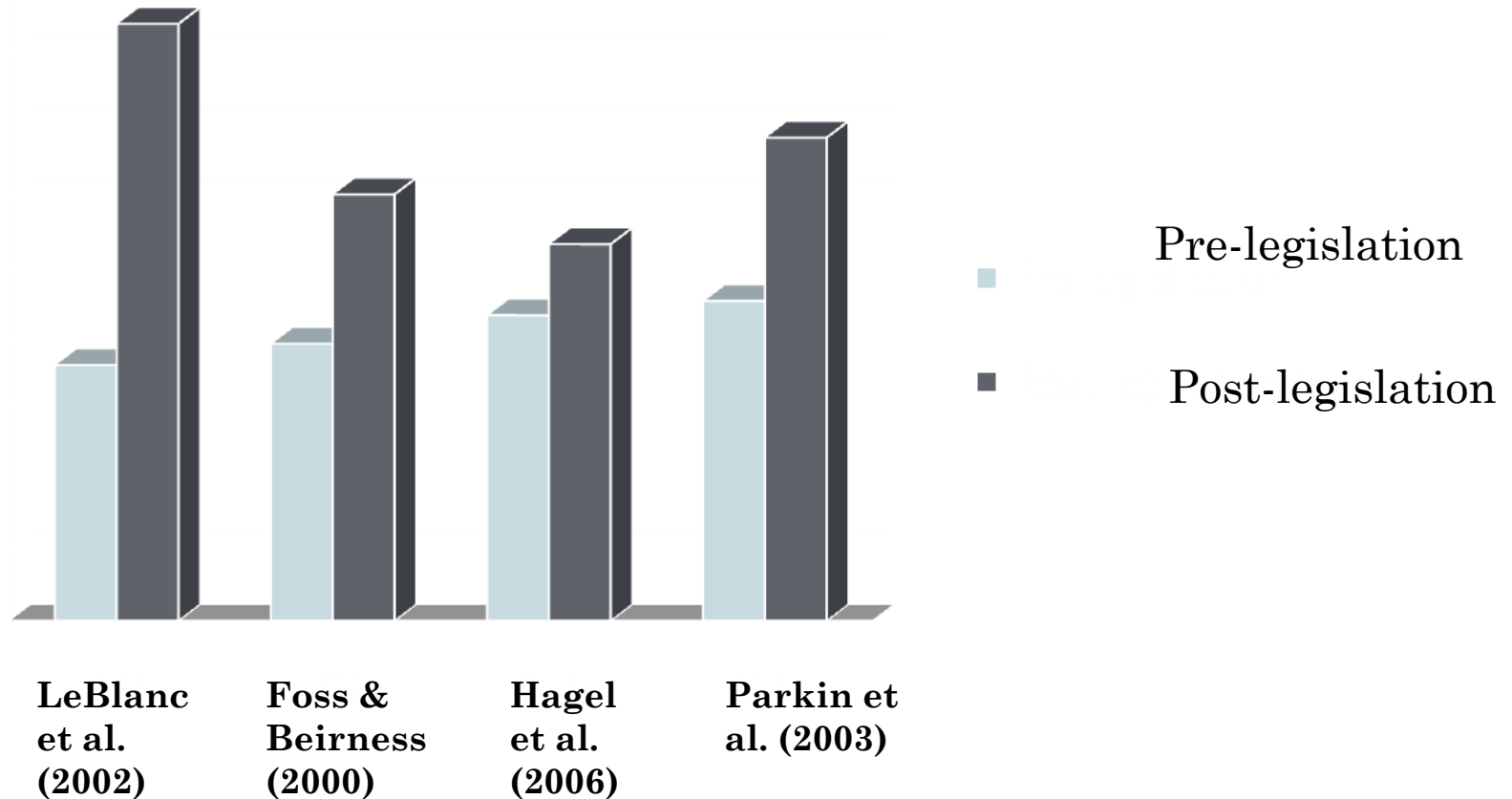
HELMET EFFECTIVENESS

Helmets are designed to help:

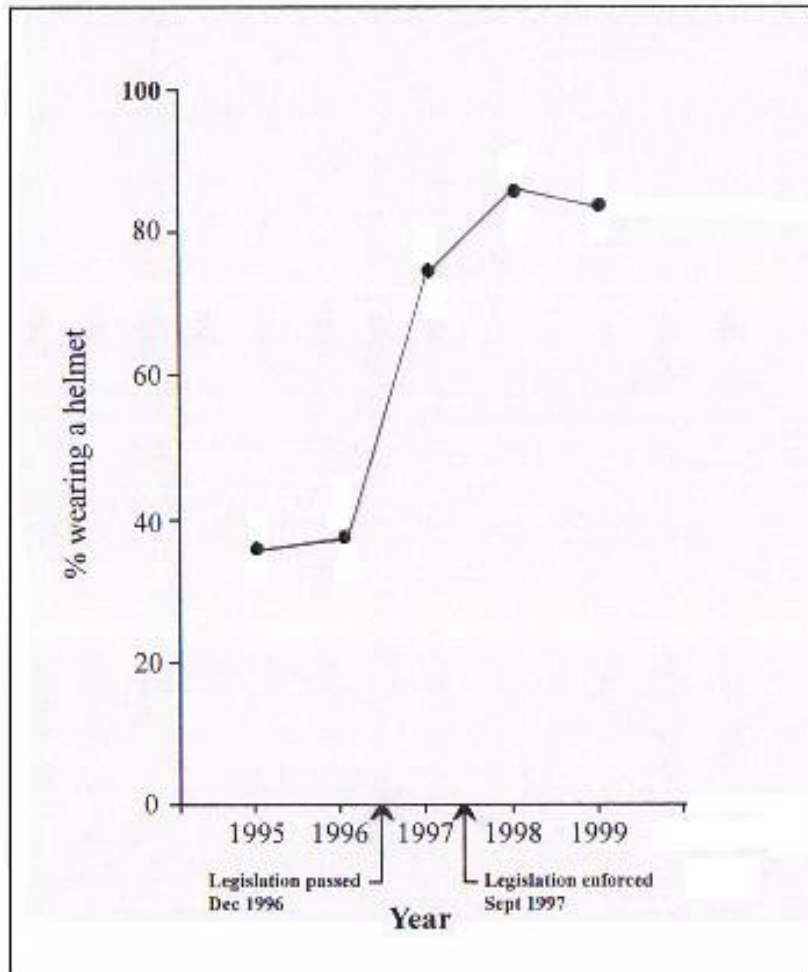
- Slow the head down gradually
- Spread the impact over a larger area
- Prevent direct impact to the skull during an injury
- Bike helmets have been demonstrated to reduce the risk of brain injury for all age groups by 88% (Thompson, 2001)

INTRODUCTION

- Helmet-use legislation has led to increased rates of helmet wearers



INTRODUCTION



Helmet Use Rates for Halifax

Year	Rate (%)
1995	35.9
1996	37.7
1997	75.3
1998	85.5
1999	83.8

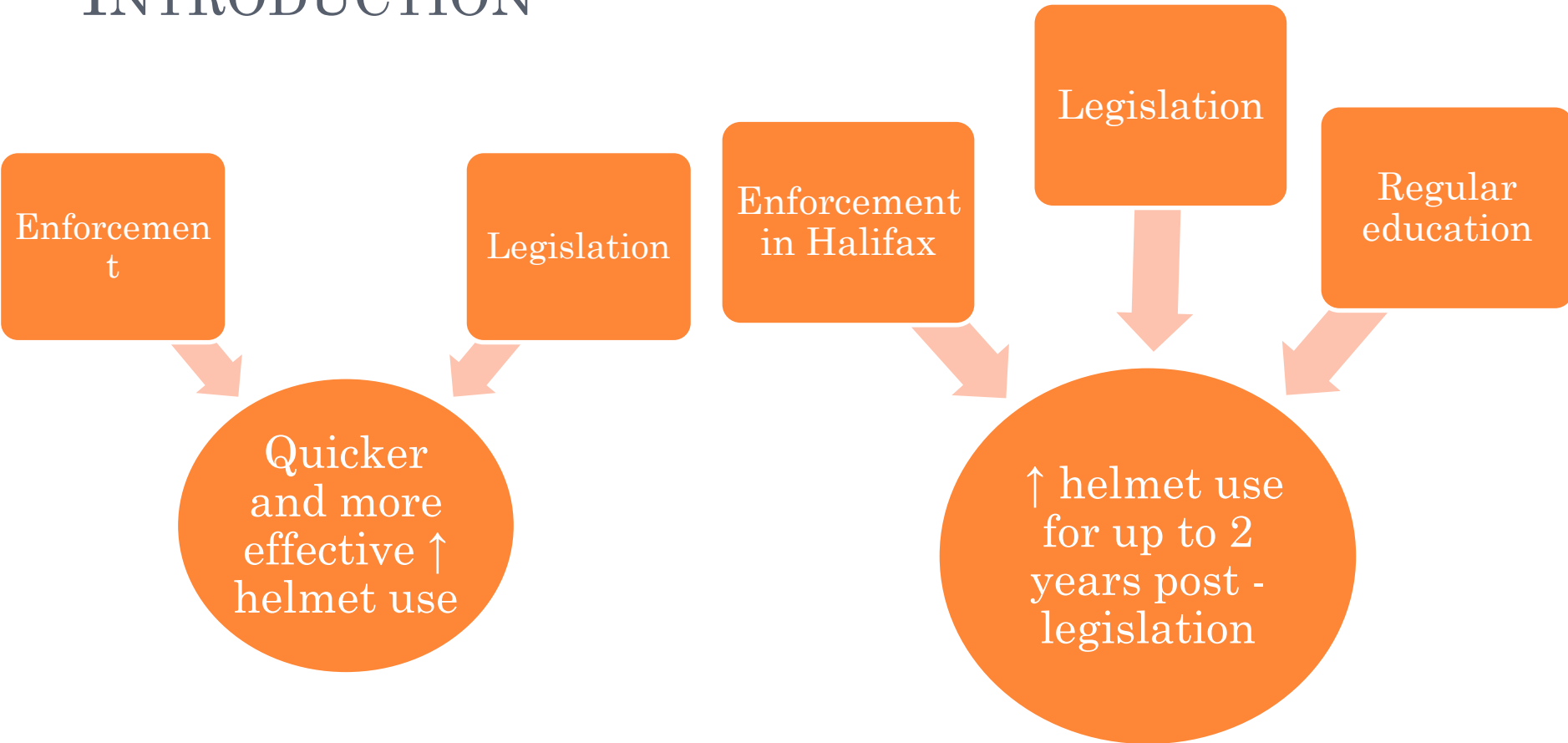
LeBlanc et al. (2002)

INTRODUCTION

- Decreases in bicycle-related injuries and deaths have been attributed, in part, to helmet legislation
- The proportion of head injuries in Halifax, Nova Scotia were reduced in half from 3.6% to 1.6% after legislation was enacted

LeBlanc et al. (2002)

INTRODUCTION



Gilchrist *et al.* (2000)

LeBlanc (2002)

PURPOSE

Phase 1 (2006)

- To examine helmet use rates in metropolitan Halifax (pop. 373,000) and in the Town of Pictou (pop. 3800) and determine the amount of education and enforcement taking place
- Compare helmet use rates, education, and enforcement between Halifax and Pictou

Phase 2 (2008)

- Implement any recommendations determined in Phase 1 and replicate the study

METHODS – PHASE 1

Halifax

- Observational data were collected from the north, south, east and west quadrants of the Halifax Peninsula (July through September, 2006)

Pictou

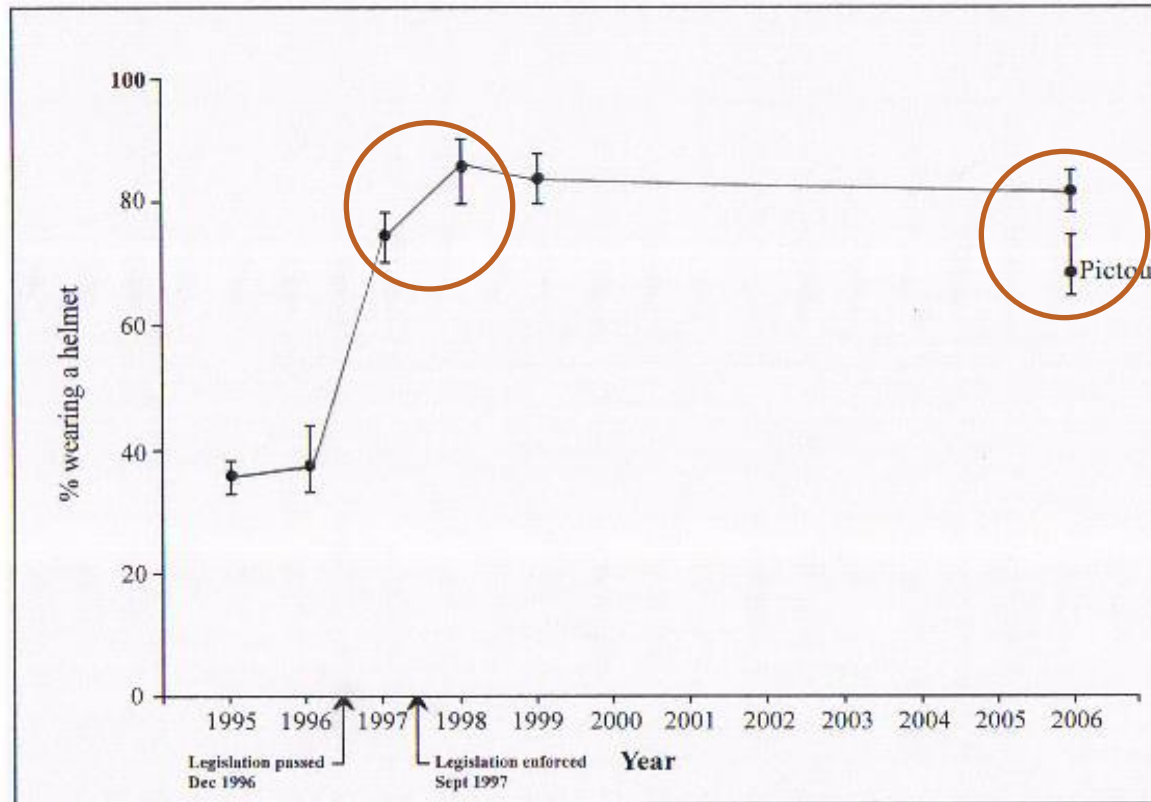
- Throughout the entire Town of Pictou
- Included a variety of neighborhoods with different property values

METHODS – PHASE 1

Enforcement and education

- Information obtained from the Halifax Regional Police Department and the Pictou detachment of the RCMP
- Interviews of bicyclists – convenience sampling
- Surveying the largest daily newspapers in Halifax and Pictou - *The Chronicle Herald*, *The Daily News*, *The News*

Results – Helmet use



Halifax- 571 cyclists
Pictou- 251 cyclists

Proportion of
helmeted cyclists
for 2006

Halifax = 82%

Pictou = 69%

Results – Helmet use

Halifax

Male = 80% Female =
89%

p value = .009

Pictou

Male = 64% Female =
80%

p value = .008

There were lower rates of helmet use among males in Pictou than among males in Halifax (p value = 0.0001)

Results – Helmet use

Halifax

Adolescent = 59%

Child = 75%

Adult = 88%

p value = 0.012

Pictou

Adolescent = 32%

Child = 70%

Adult = 79%

p value = 0.059

Results - Enforcement

Halifax

Enforcement began on Sept.1, 1997 and has continued through to 2006

From 2000 to 2006 total of 1001 summary offence tickets issued

Pictou

No enforcement from the passing of the law in December, 1997 through to June, 2006

From June, 2006 through September, 2006, minimal enforcement - 5 bicycles impounded

Results - Education

Regular education has been carried out by police and community members in both Halifax and Pictou since the passing of the law in 1996

Routine visits to schools

Education during patrol

Bike rodeos

(an event usually held by police where a bike and helmet inspection are done as well as an obstacle course using safety signs)

Conclusions Phase 1

- Helmet use rates of urban and rural adolescents are lower than rates found among children and adults

Conclusions – Phase 1

Halifax



Pictou



Phase 2

- The RCMP in Pictou as well as the policing forces in surrounding towns were apprehensive about issuing summary offense tickets (SOTs)
- Little enforcement – difficult to compare helmet use between regions
- Need a way to convince the police in Pictou and the surrounding towns to issue SOTs
 - diversion/educational program (Noggin Knowledge)
 - rewards program
 - school-based education
 - 5 Pictou district schools visits- Police/ Dr. Boutlier Neurosurgery/ThinkFirst Program with VIP
 - Eastlink TV panel discussion on helmets and brain injury prevention
 - Helmets for children of economic need

NOGGIN' KNOWLEDGE

Police provided a diversion activity (Noggin Knowledge) instead of giving a ticket

Educational session designed to teach individuals the risks associated with not wearing a helmet encourage them to comply with helmet safety laws and other rules of the road

For those wearing helmets- rewards were given out (i.e. pencils, glow in dark bracelets)

Helmets for needy family

OPERATION HEADWAY/NOGGIN' KNOWLEDGE

- Partnering for Injury Prevention
 - Key players
 - Lynne Fenerty and Dr. Simon Walling – Neuro-Trauma/Injury Prevention Program, CDHA
 - Helmet Safety Action Committee Partners
 - Nova Scotia Department of Health Promotion and Protection
 - QEII/IWK Division of Neurosurgery
 - Think First/Aviva Insurance Company of Canada
 - IWK Child Safety Link
 - Brain Injury Association of Nova Scotia
 - Emergency Health Services Nova Scotia
 - Canadian Paraplegic Association
 - Dr. Nicole Boutilier – Head of ER /Acting Chief of Staff, PCHA
 - Eileen MacIsaac - Director of Public Relations, PCHA
 - Representatives from the 5 police departments
 - Sherry Huybers and Dr. John LeBlanc – Dalhousie University

Phase 2 Results - Enforcement

Halifax

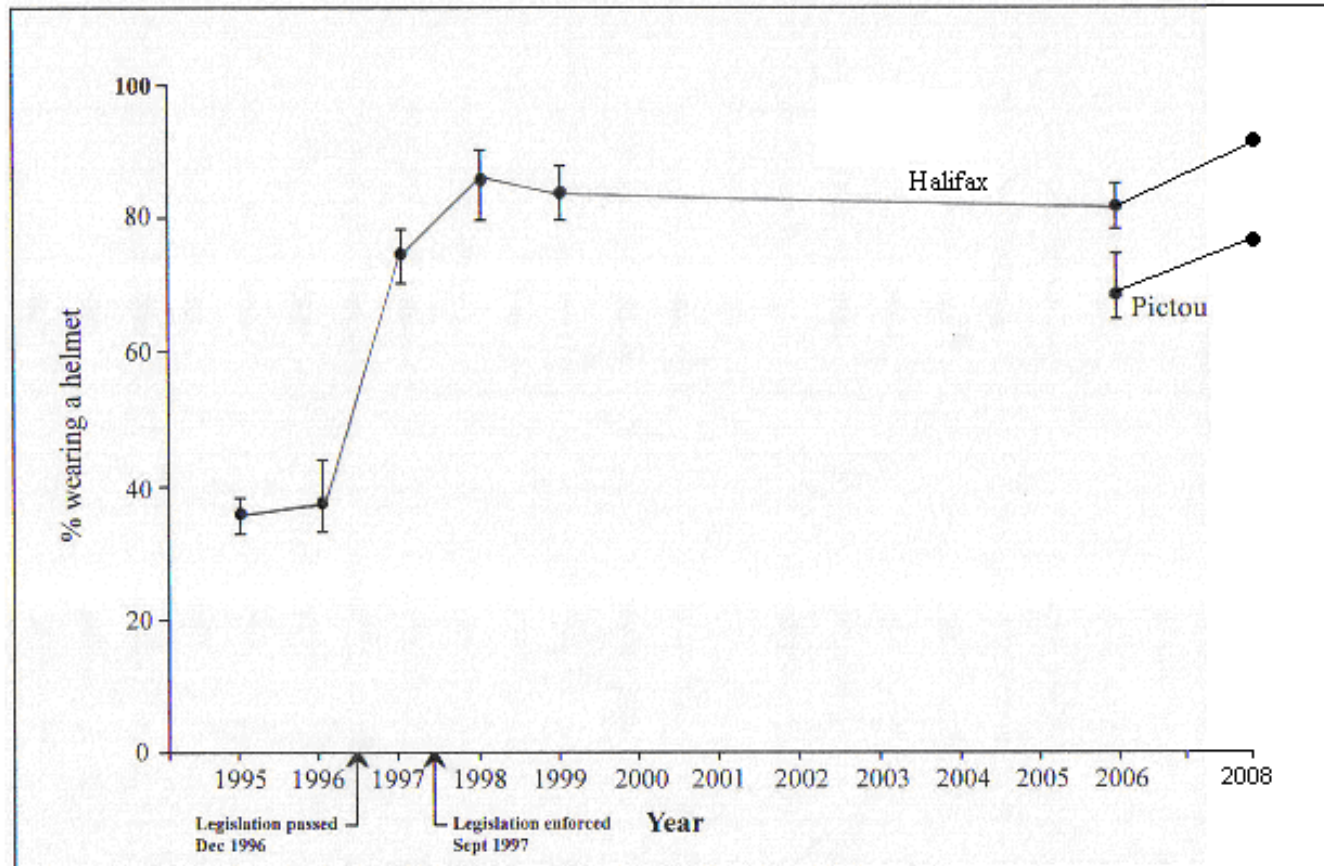
2006 - 301 SOTs issued
2007 - 355 SOTs issued
**2008 - 177 SOTs issued
up to the end of
September 2008**

Pictou

2006 – minimal enforcement
2007 – minimal enforcement
**2008 – 7 SOTs issued plus a
substantial number of
warnings**

Results – Phase 2

Helmet Use



Halifax
2006 = 82%
2008 = 92%

Pictou
2006 = 69%
2008 = 77%

Conclusions

- The significant increase in helmet use in Pictou (from 69% to 77%) indicates that enforcement *may* contribute to higher rates of helmet use (for children)
- Increase in education and positive policing in Pictou may have played a role as well in improved helmet use
- The continued increase in helmet use in Halifax (currently 92%) indicates that ongoing enforcement and education is effective (for all age groups)

Co Authors

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Ice Skating

Implementation of a
mandatory helmet rule

OVERVIEW

- Rationale
- Background information
- Methods
- Results
- Conclusion
- Acknowledgments
- Questions

RATIONALE

- Collaborative research project with Dalhousie University to examine the effects of introducing mandatory helmet use for skating

SKATING HELMETS

- Helmet policy paper (2007)
- Excellent example of collaboration (community, researcher, recreation and injury stakeholders, and government)
- Developing evidence to inform public policy and create supportive environments

SKATING HELMETS

Next Steps

- Continue to expand and build case
- Work with rinks and communities who are ready
- Explore other options to leverage helmet policy development
- Legislation? Not yet

WINTER SPORTS AND HELMETS

- Winter sports combine speed with a hard, slippery surface – potential for injury
- Rates of injury in ice skating are significant

ICE SKATING INJURIES – RESEARCH

- Ice skating produces 3 times more head injuries than either roller or inline skating
- The rate of concussion due to ice skating
 - 5 times higher than from roller skating
 - 7 times higher than from inline skating (Knox, 2006)
- Video analysis - harder to break your fall on ice with your arms – more likely to hit your head (Knox, 2006)

ICE SKATING AND INJURY

- **In Ontario alone in 2004-05:**
 - 5012 emergency room visits
 - 283 hospitalizationsdue to falls while skating
- 21 % of these were head and neck injuries

Extrapolating:

- **In Canada:**
 - 3072 emergency room visits

IWK CHIRPP DATA –SKATING

- 68% occurred in rinks
- 75% occurred during recreational activity

Long-term risk of epilepsy after traumatic brain injury in children and young adults: a population-based cohort study

Jakob Christensen, Marianne G Pedersen, Carsten B Pedersen, Per Sidenius, Jørn Olsen, Mogens Vestergaard

Summary

Background The risk of epilepsy shortly after traumatic brain injury is high, but how long this high risk lasts is unknown. We aimed to assess the risk of epilepsy up to 10 years or longer after traumatic brain injury, taking into account sex, age, severity, and family history.

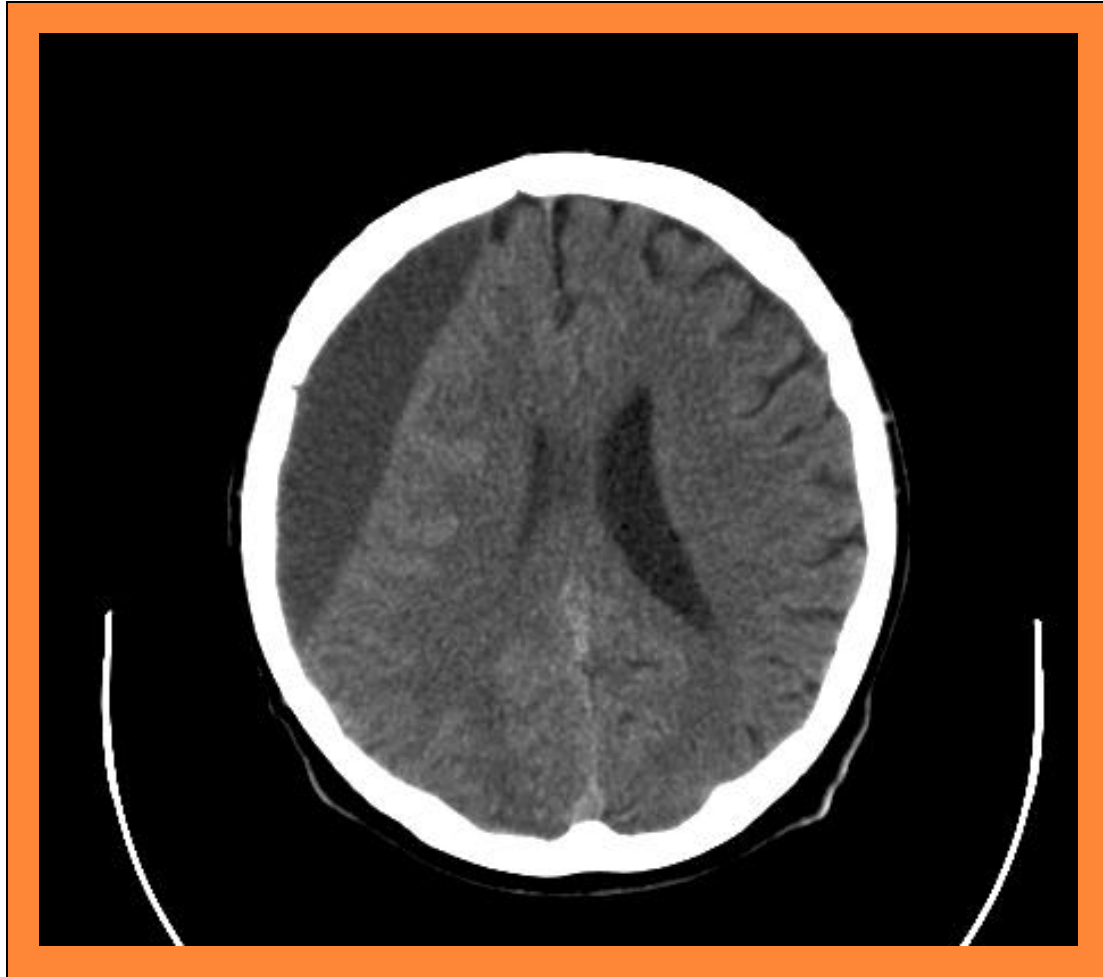
Methods We identified 1 605 216 people born in Denmark (1977–2002) from the Civil Registration System. We obtained information on traumatic brain injury and epilepsy from the National Hospital Register and estimated relative risks (RR) with Poisson analyses.

Risk of epilepsy was increased after a mild brain injury (RR 2·22, 95% CI 2·07–2·38)

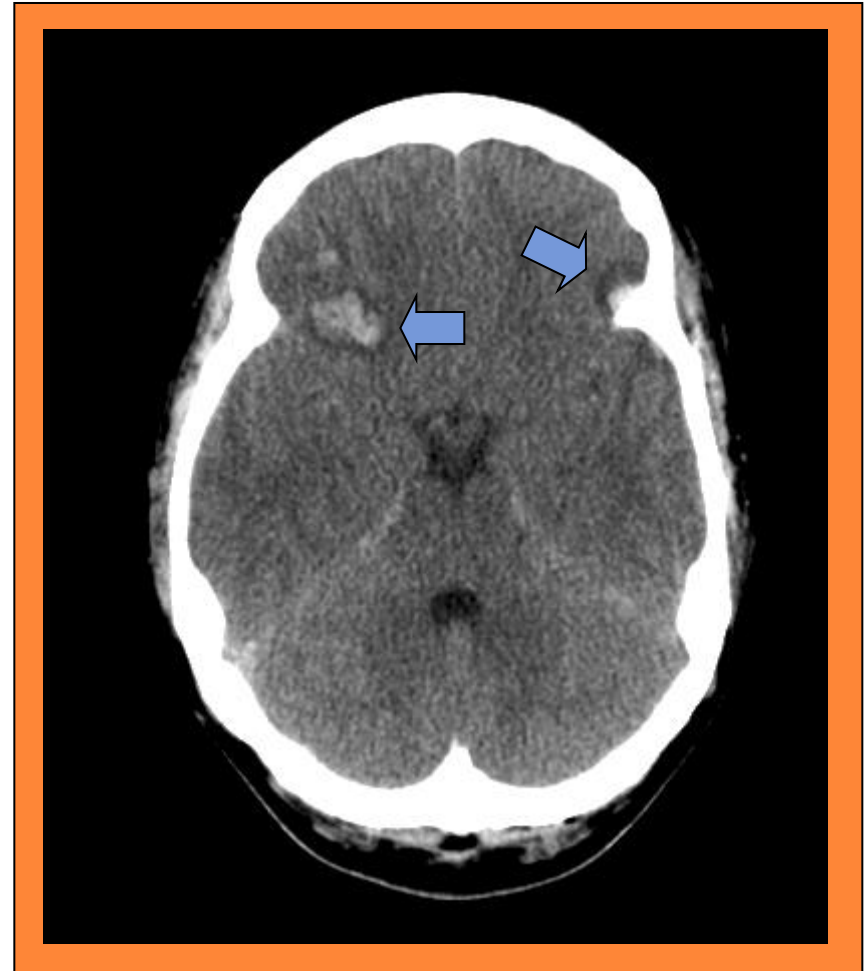
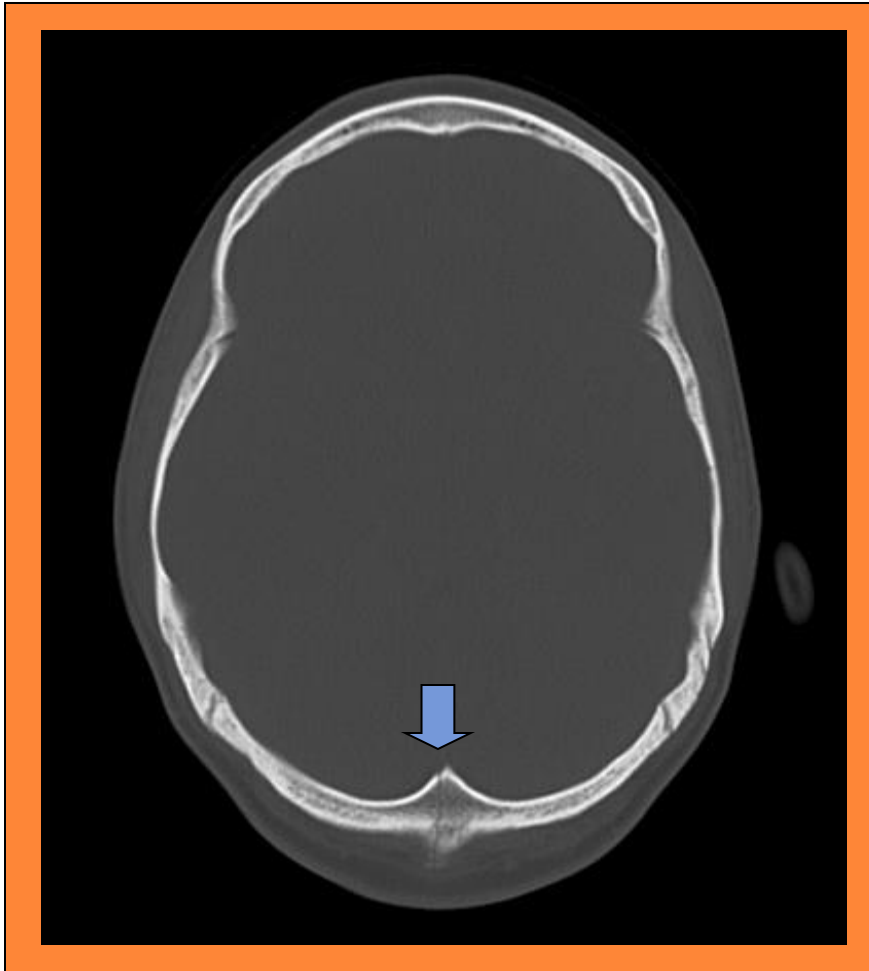
(7·40, 6·16–8·89), and skull fracture (2·17, 1·73–2·71). The risk was increased more than 10 years after mild brain injury (1·51, 1·24–1·85), severe brain injury (4·29, 2·04–9·00), and skull fracture (2·06, 1·37–3·11). RR increased with age at mild and severe injury and was especially high among people older than 15 years of age with mild (3·51, 2·90–4·26) and severe (12·24, 8·52–17·57) injury. The risk was slightly higher in women (2·49, 2·25–2·76) than in men (2·01, 1·83–2·22). Patients with a family history of epilepsy had a notably high risk of epilepsy after mild (5·75, 4·56–7·27) and severe brain injury (10·09, 4·20–24·26).

Interpretation The longlasting high risk of epilepsy after brain injury might provide a window for prevention of post-traumatic epilepsy.

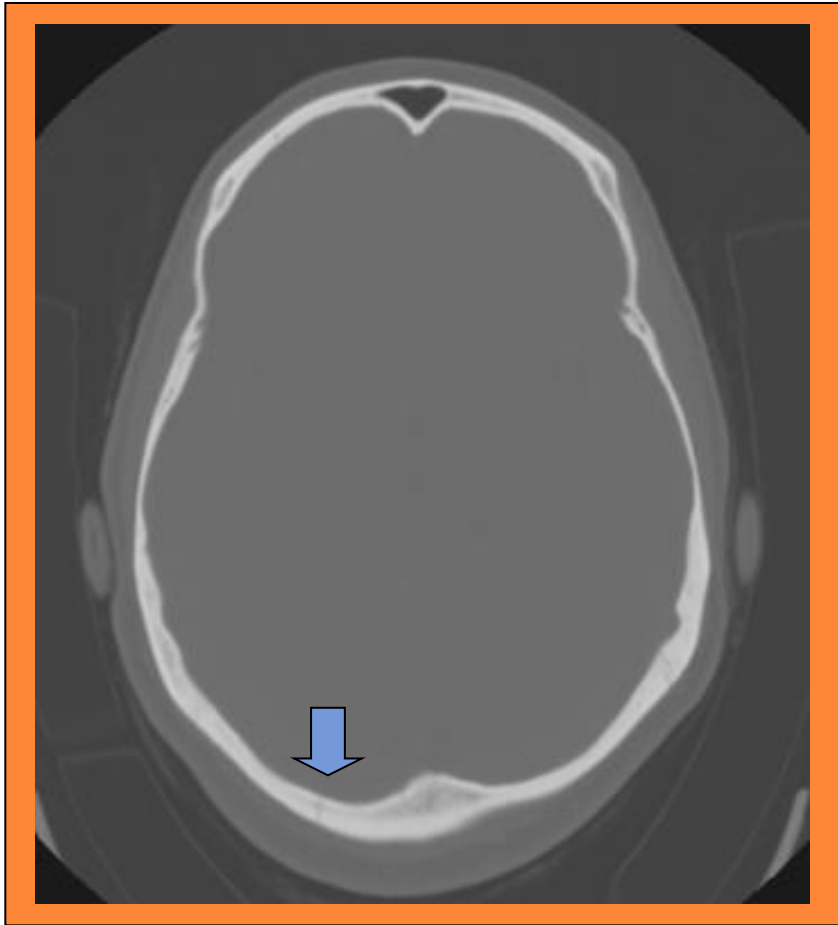
INJURIES FROM FALLING ON ICE AT RINK



INJURIES FROM FALLING ON ICE AT RINK



INJURIES FROM FALLING ON ICE AT RINK



HEAD INJURIES AND SKATING

- Significant problem
- Examine impact of regulation

HELMETS AT DALHOUSIE MEMORIAL ARENA



Mandatory helmet use was implemented at Dalhousie Memorial Arena January 1, 2010



Division of Neurosurgery, QEII has undertaken a research project to monitor the impact of helmet regulation on skating at Dalhousie University

PURPOSE

To study helmet use, and to study the effects of the regulation on skating practices after implementation

METHODS

Phase 1

- Pre-Implementation Observational Study (October-December 2009)

Phase 2

- Education and Awareness

Phase 3

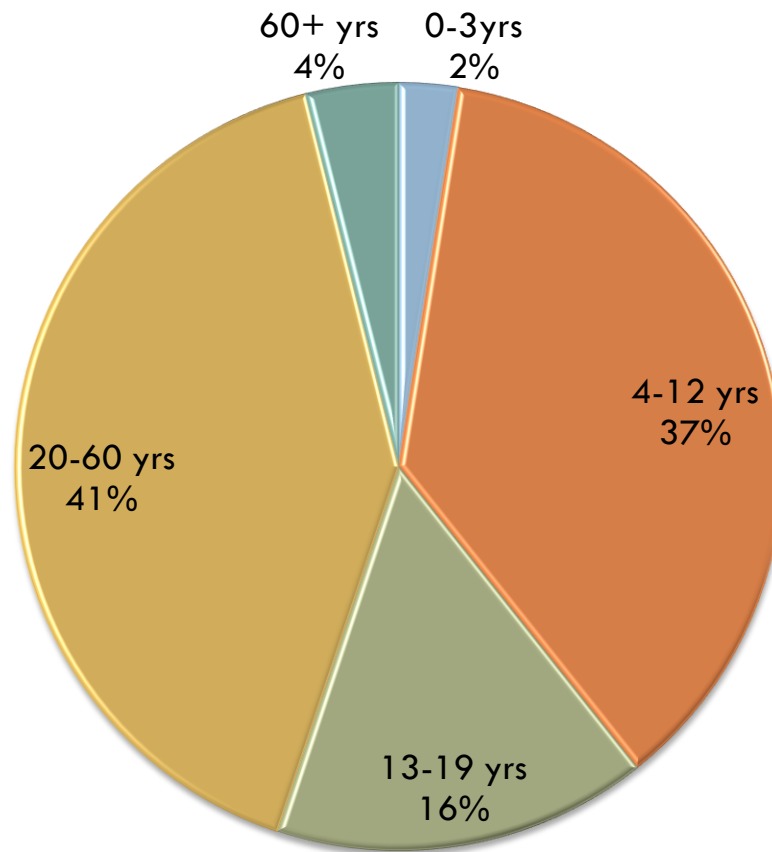
- Post-Implementation observations (January-March 2010)

REGULATION OF HELMETS FOR SKATING

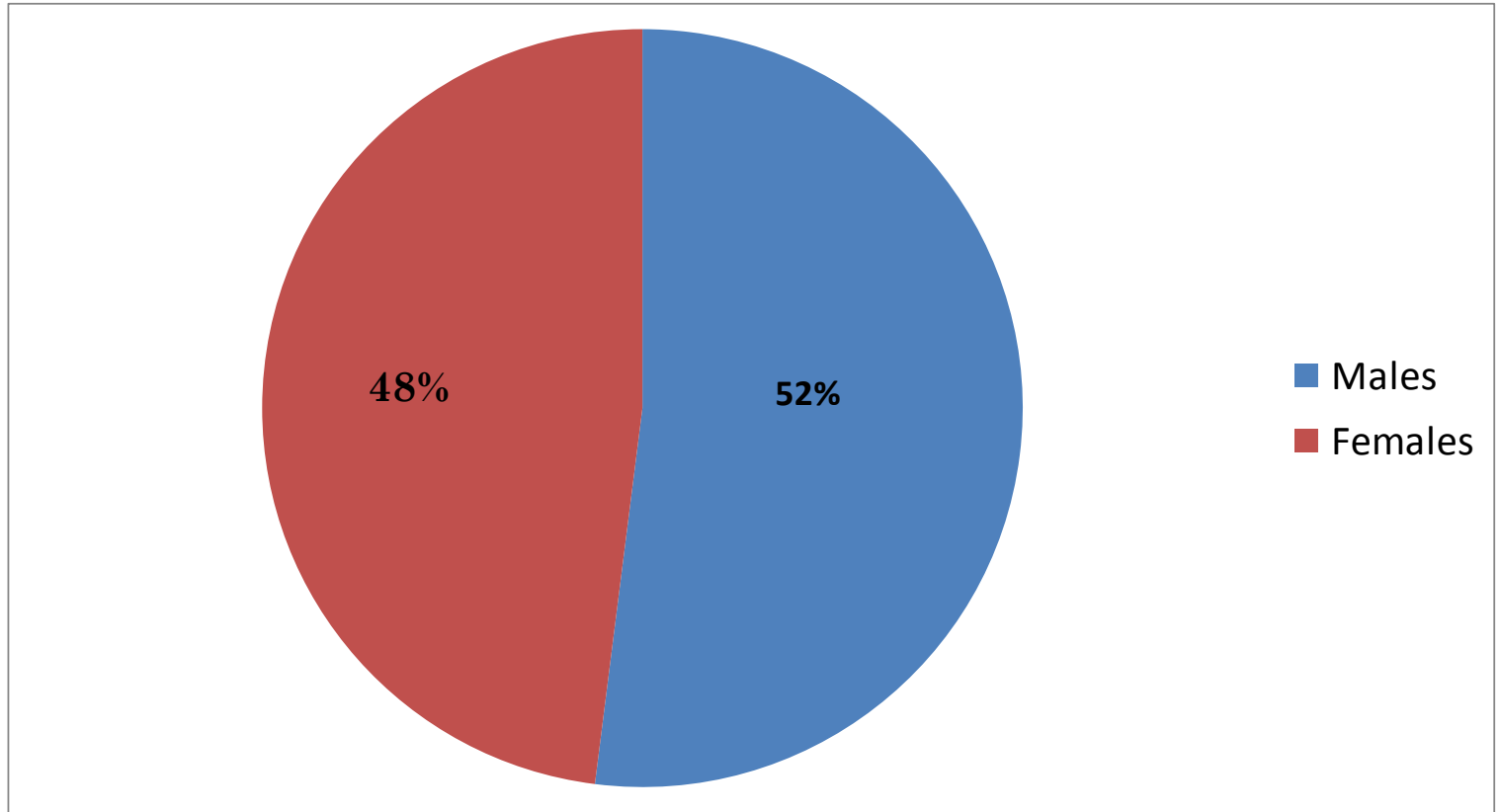
Phase 1

- Pre-Implementation Results

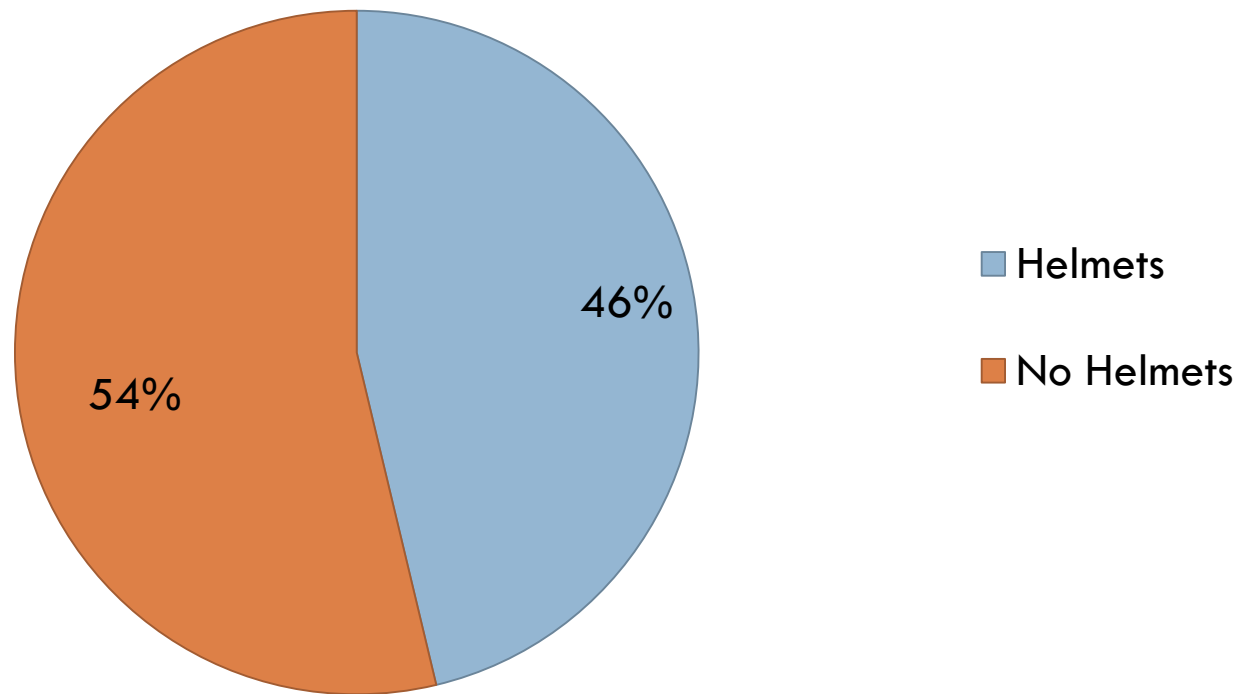
SKATING DEMOGRAPHICS – AGE DISTRIBUTION (PRE-IMPLEMENTATION)



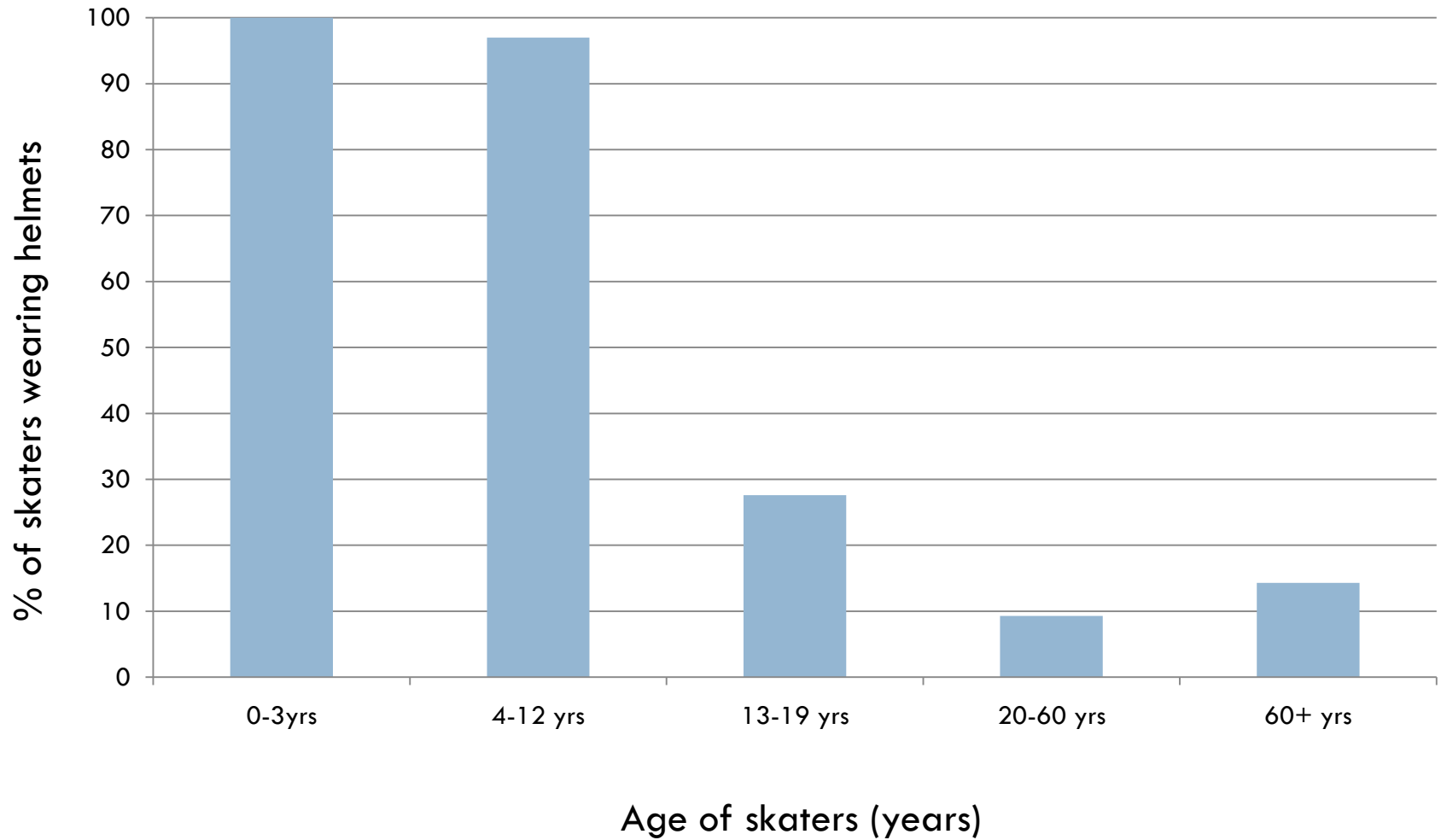
GENDER DISTRIBUTION OF SKATERS



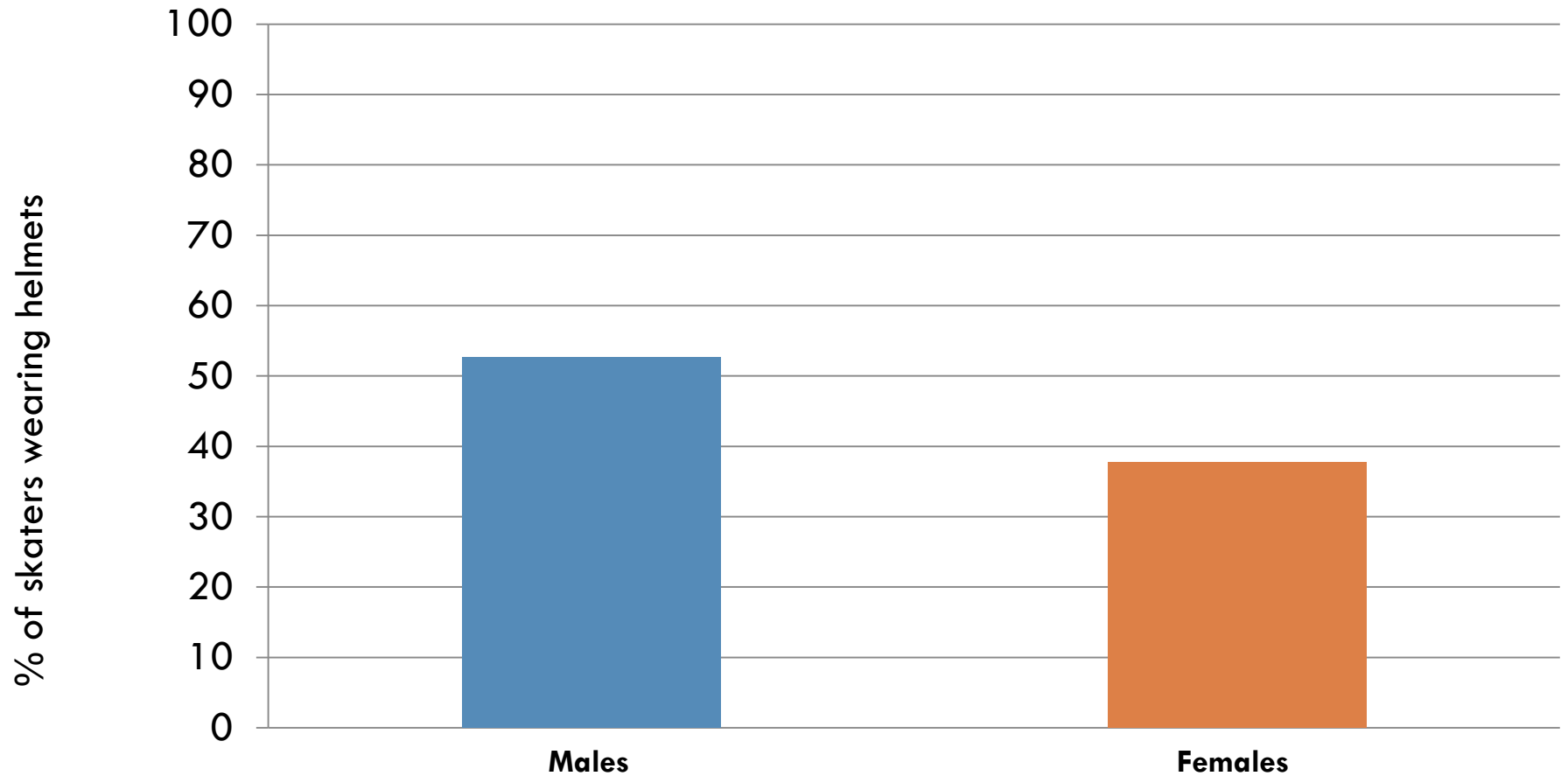
FRACTION OF SKATERS WEARING HELMETS



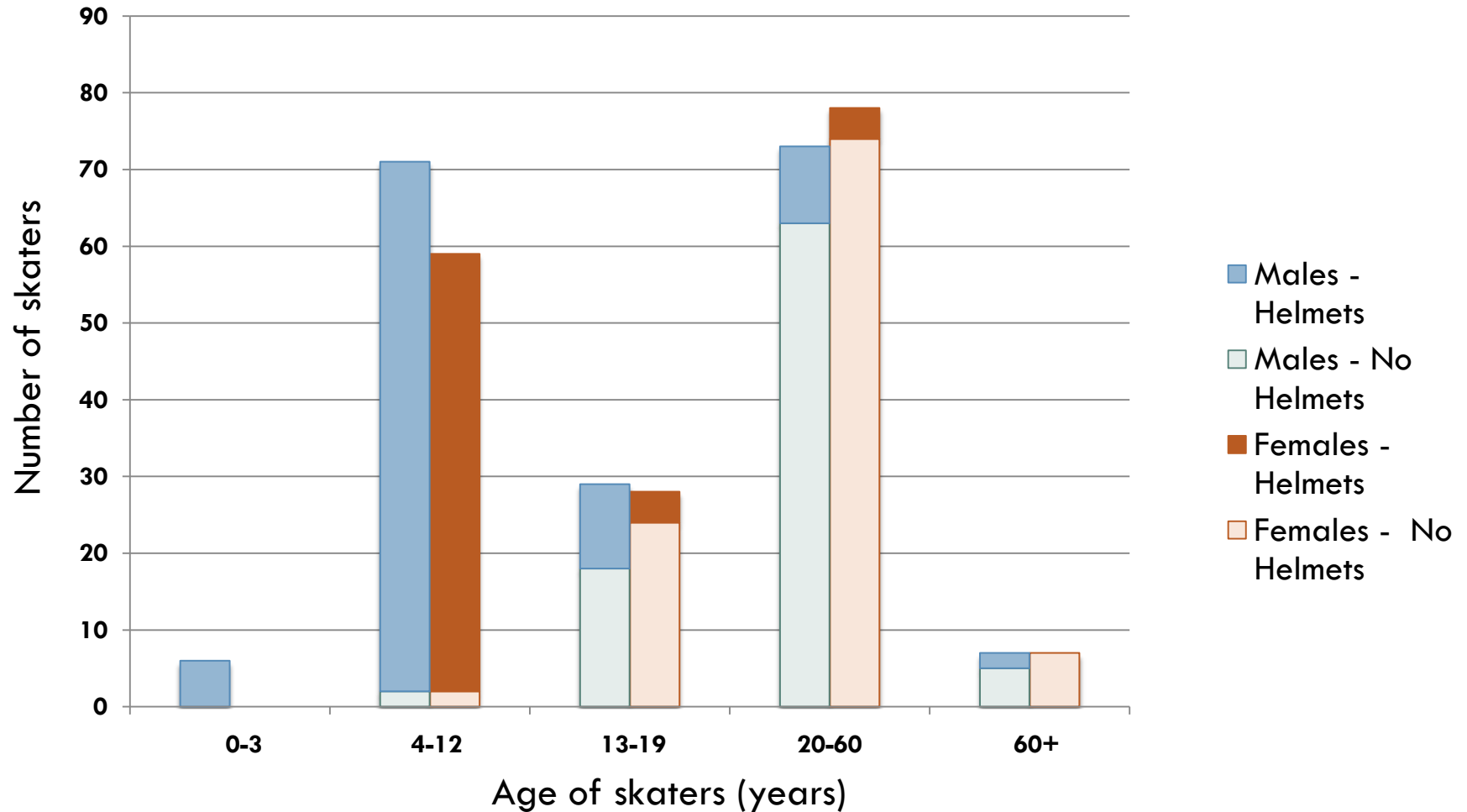
HELMET USE - BY AGE



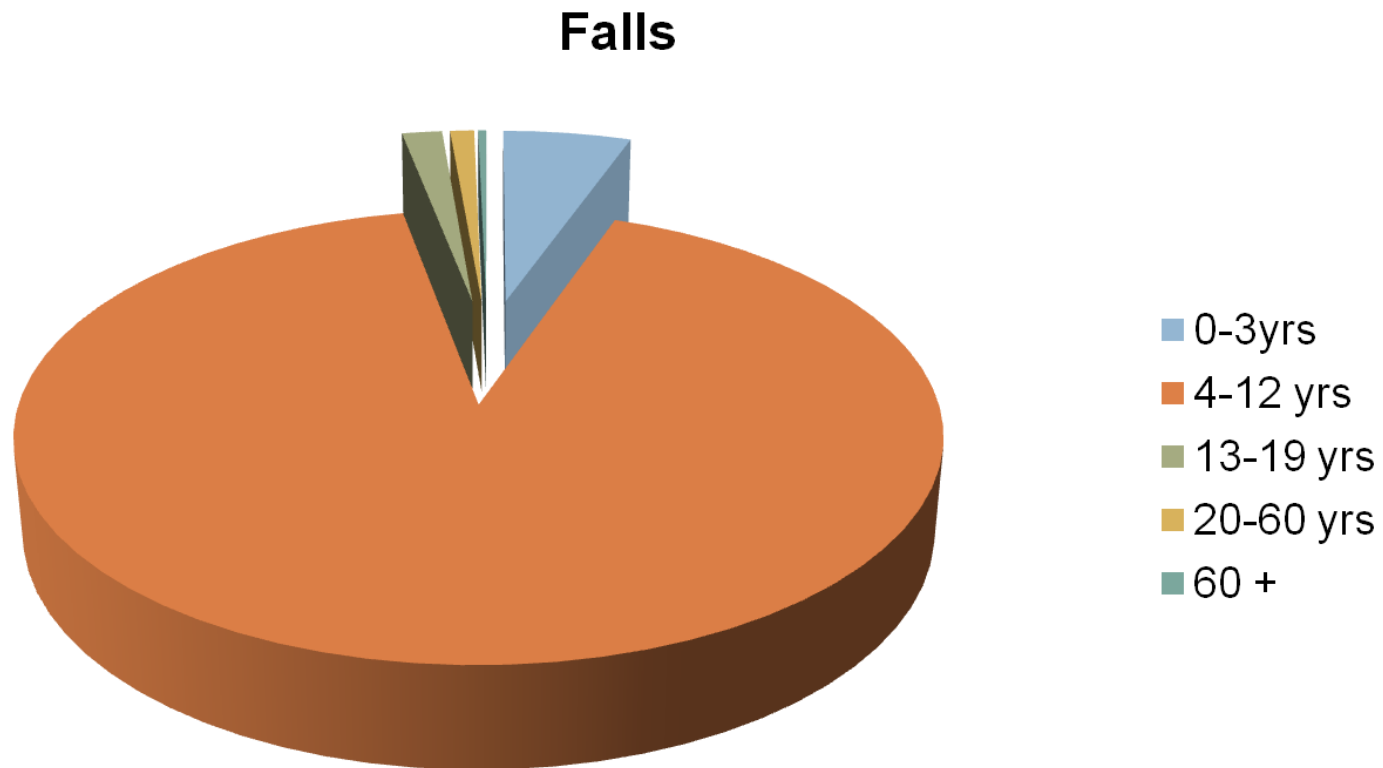
HELMET USE BY GENDER



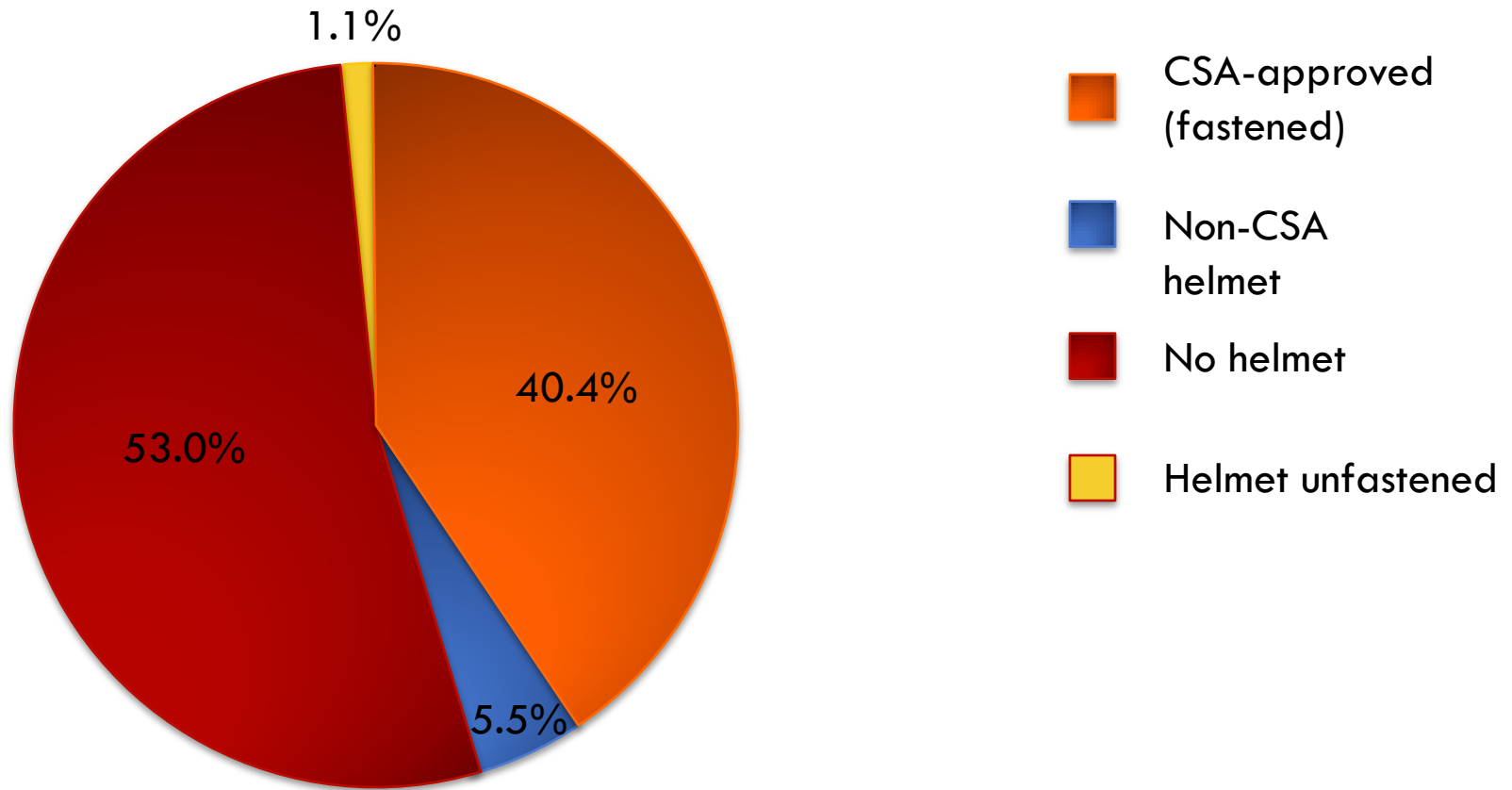
HELMET USE – BY GENDER AND AGE



FALLS — BY AGE



PROPER HELMET USE



REGULATION OF HELMETS FOR SKATING

Phase 3

- Post-Implementation Results

HELMET USE — POST-IMPLEMENTATION

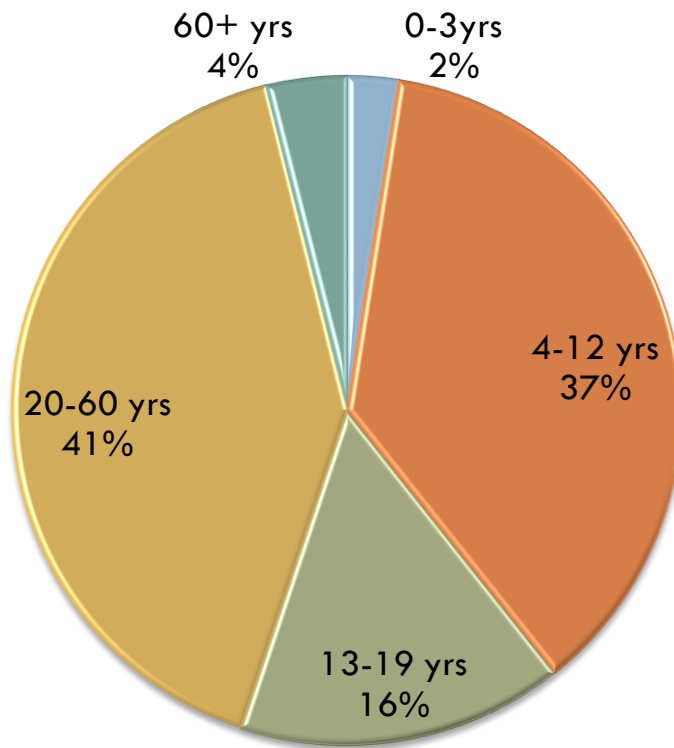
- Only 2 of 358 observations — no helmet
- 2 instances of non-CSA approved helmet
- 5.6% of observations involved incorrect helmet use

Impact of regulation on participation in skating

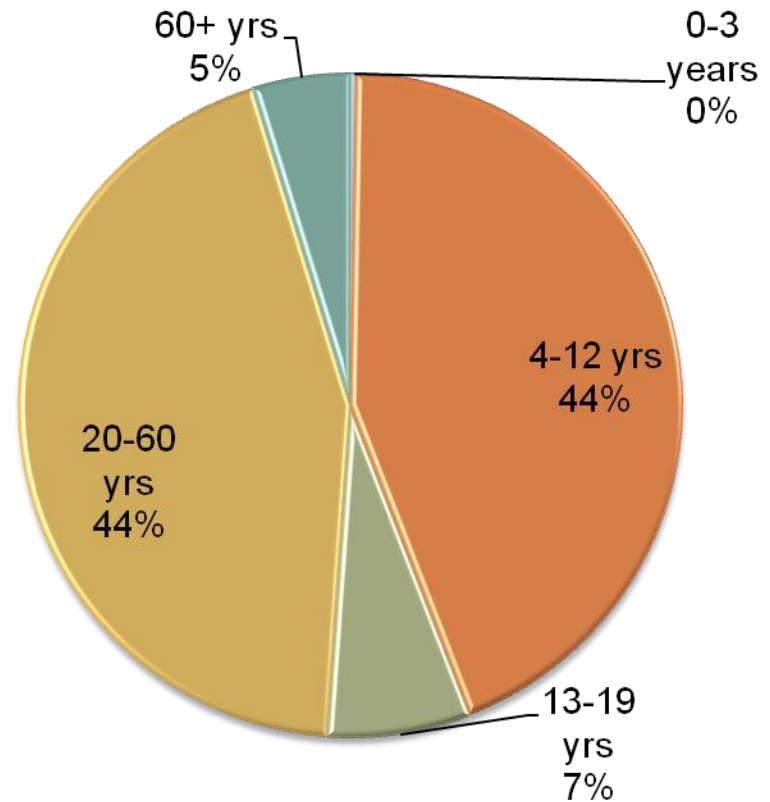
- 361 participants observed in pre-implementation period
- 358 participants observed during same number of observation-hours post-implementation

DEMOGRAPHICS – PRE- AND POST-IMPLEMENTATION

Pre-implementation

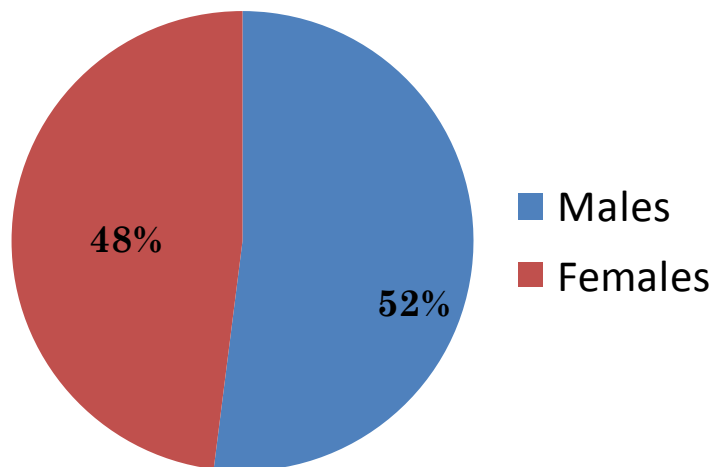


Post-implementation

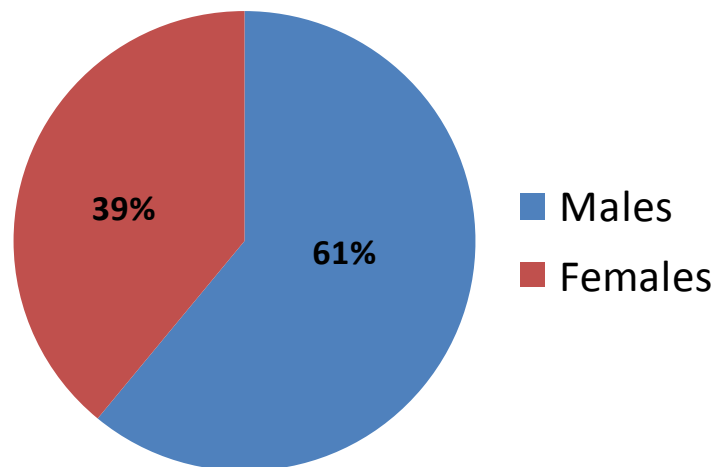


Gender Distribution Pre- and Post-Implementation

Pre-Implementation



Post-Implementation



Conclusions

- Rates of helmet use have risen from 40.4% correct usage to 93.3%, with 99.4% of skaters using helmets post-implementation of regulations
- Rates of overall participation in skating have not been significantly affected
- Rates of teen skating are lower; however, skaters from all age groups continue to participate
- Changes in gender distribution of skaters were noted

Acknowledgements

- Research Team
- Dr. David Clarke
 - Lynne Fenerty
 - Ginette Thibault-Halman
 - Jessica Heaton
 - Lisa Sangster
 - Kathie Wheadon-Hoare
- Contributions
 - Dr. Simon Walling
 - Roy Dempsey
 - Julian Young

Skiing and Snowboarding

Observational Study of Helmet Use on Ski Hills in Nova Scotia

Ski and Snowboard Helmets

- Helmet Policy Paper (2007)
- Natasha Richardson (public and political support)
- Opportunity to establish baseline data
- Develop relationships industry
- Conduct the formative behavioural research

Overview

- Research Question/Rationale
- Background and Literature
- Study Design
- Sample Selection & Ethical consideration
- Data Collection
- Data Analysis

Ski Snowboard Study in NS

- Phase 1 – OBSERVATION STUDY

- January –February 2010

- Phase 2 – QUALITATIVE STUDY

- *February 2010*
 - Educational displays and presentations
 - Intercept interviews

TBI in skiing

TBI accounts for 50%-88% of fatalities at various ski resorts

(Levy et al. J Trauma 2002)

Purpose

1. Examine helmet use as on ski hills in Nova Scotia
 1. Quantitative – who is wearing helmets?
 2. Qualitative – reasons for wearing helmet or not
2. Provide education and promotion for increased helmet use

Methods – Quantitative Observations

- Data collectors were present in public areas of all three ski hills in Nova Scotia:
 - Percent of skiers/snowboarders using helmets
 - Correct helmet use
- 15 minute interval = 1 observation
- Four or more observations
 - days and nights
 - week and weekend
- Inter-rater reliability

Methods – Quantitative Observations

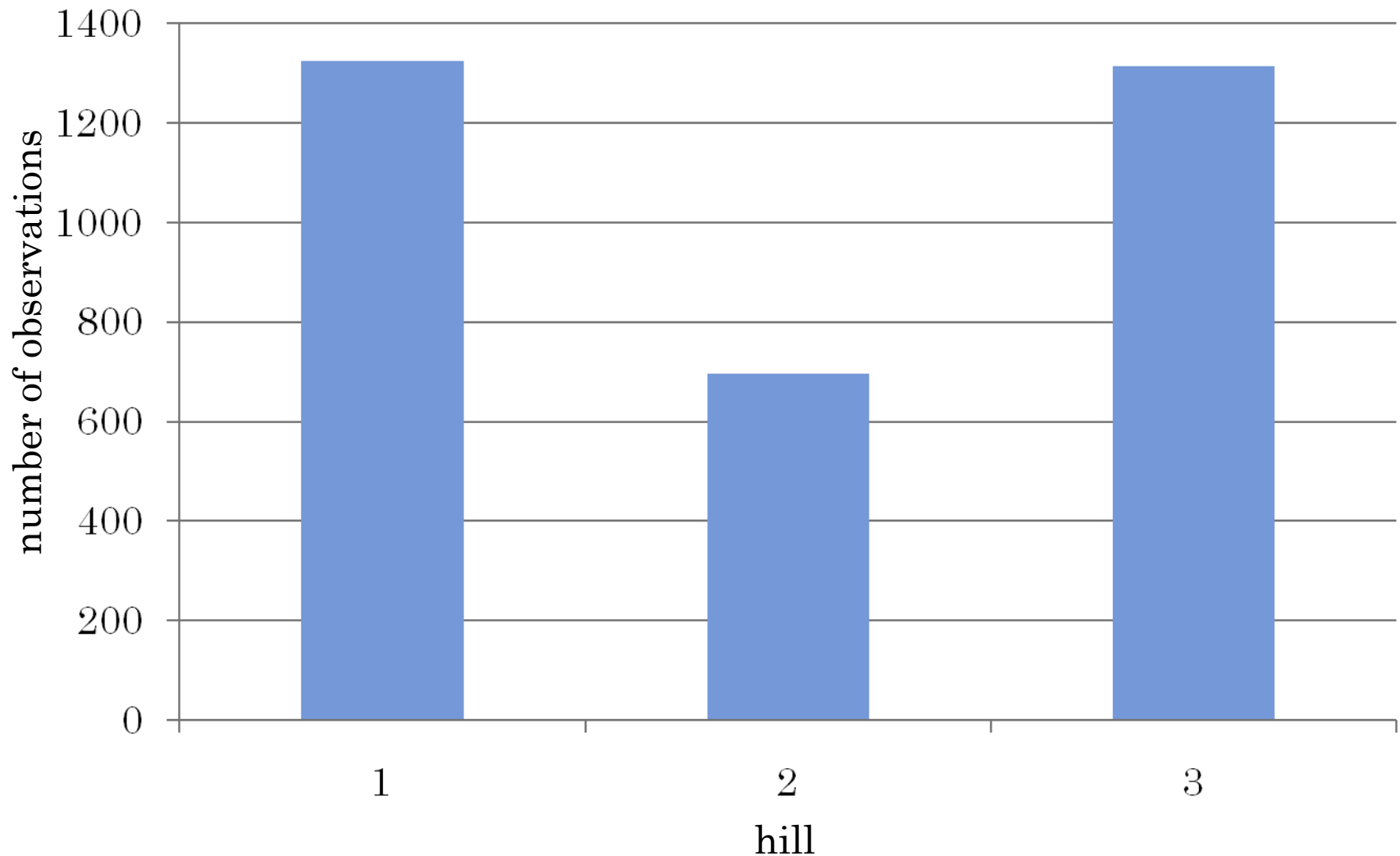
Helmet Observations

- Age
- Sex
- Proper helmet
- Proper helmet fit
- Child (attend by guardian with or without helmet)

Falls Observations

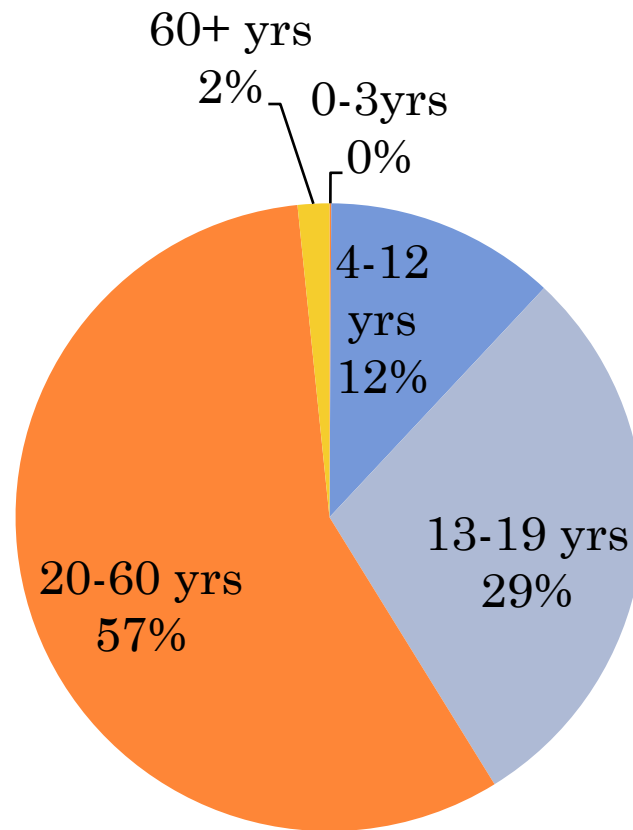
- Helmet (yes/no)
- Frequency
- Age
- Sex
- Number of persons in collision
- Impact area
- Resume sport or sitting out
- First aid required

Number of Observations per Hill

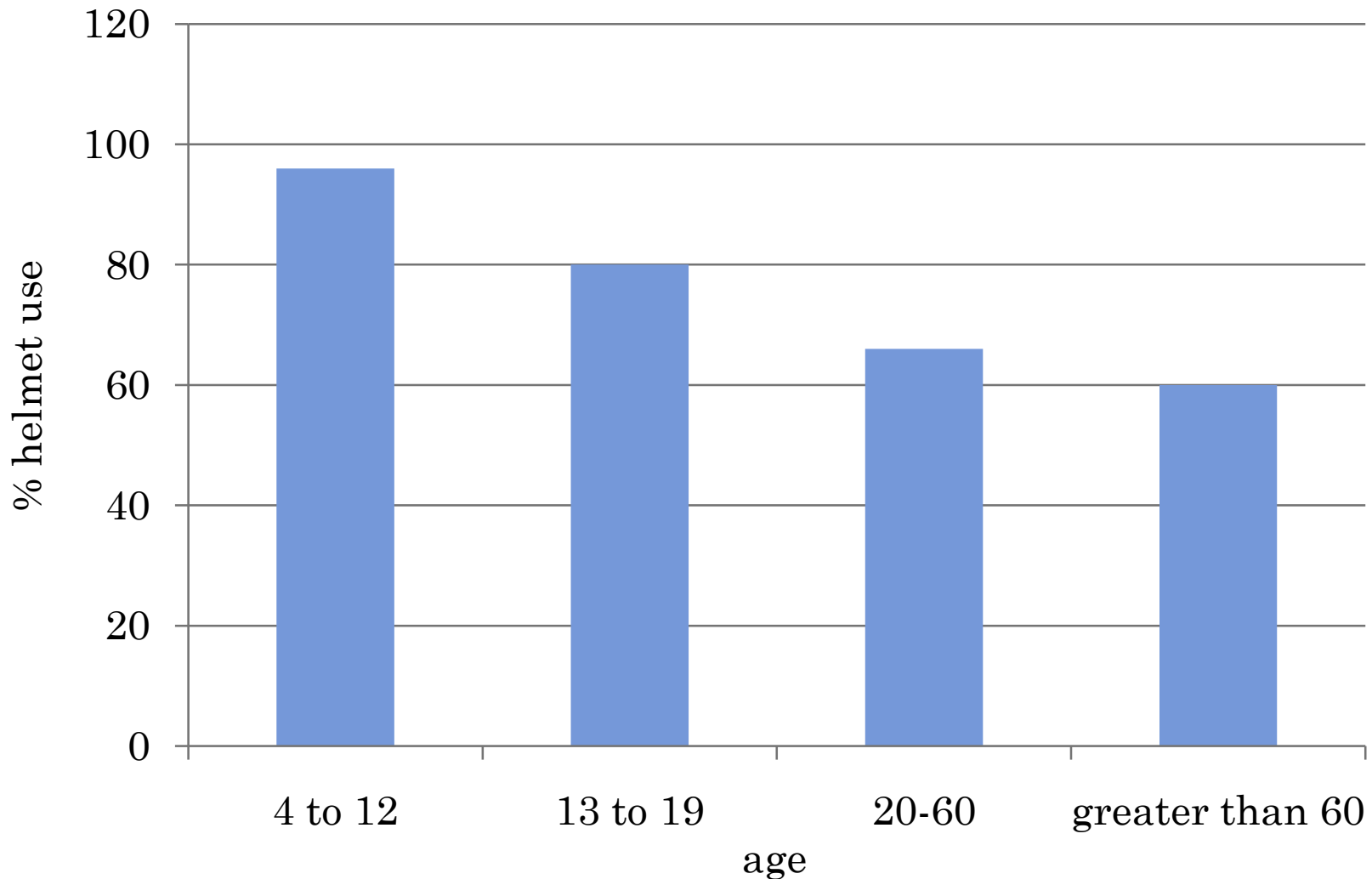


Demographics – Age

N= 3336

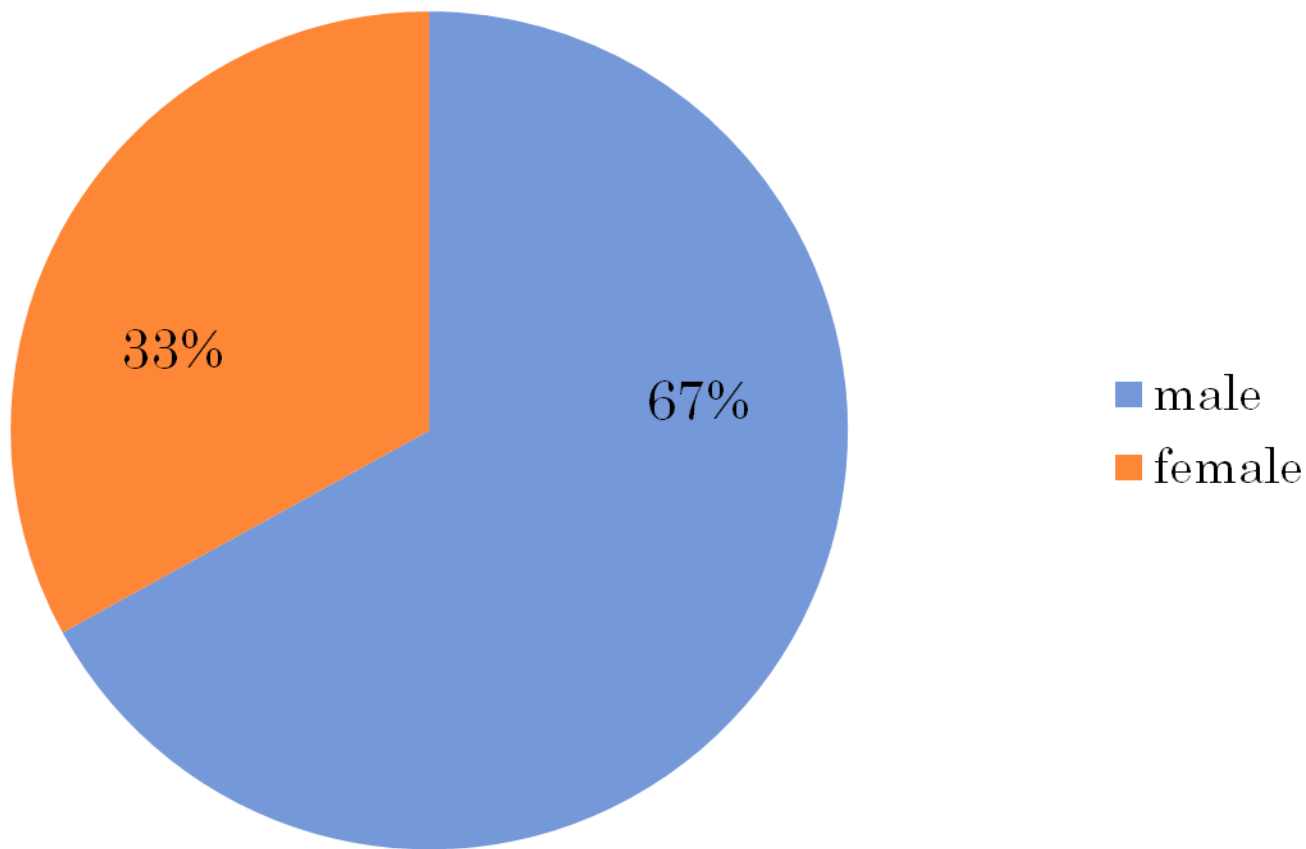


Helmet Use - Age

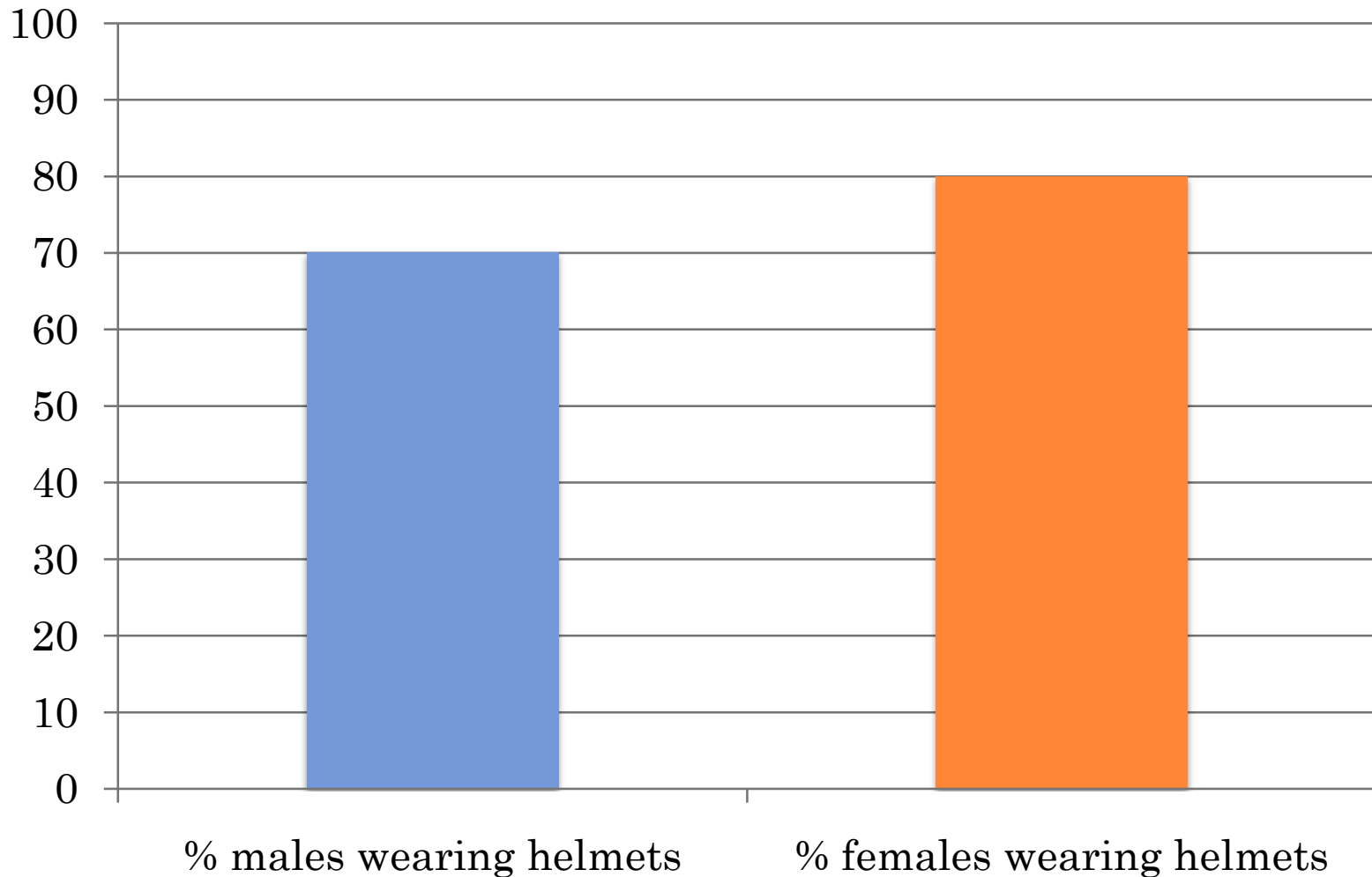


Demographics – Gender

N=3336



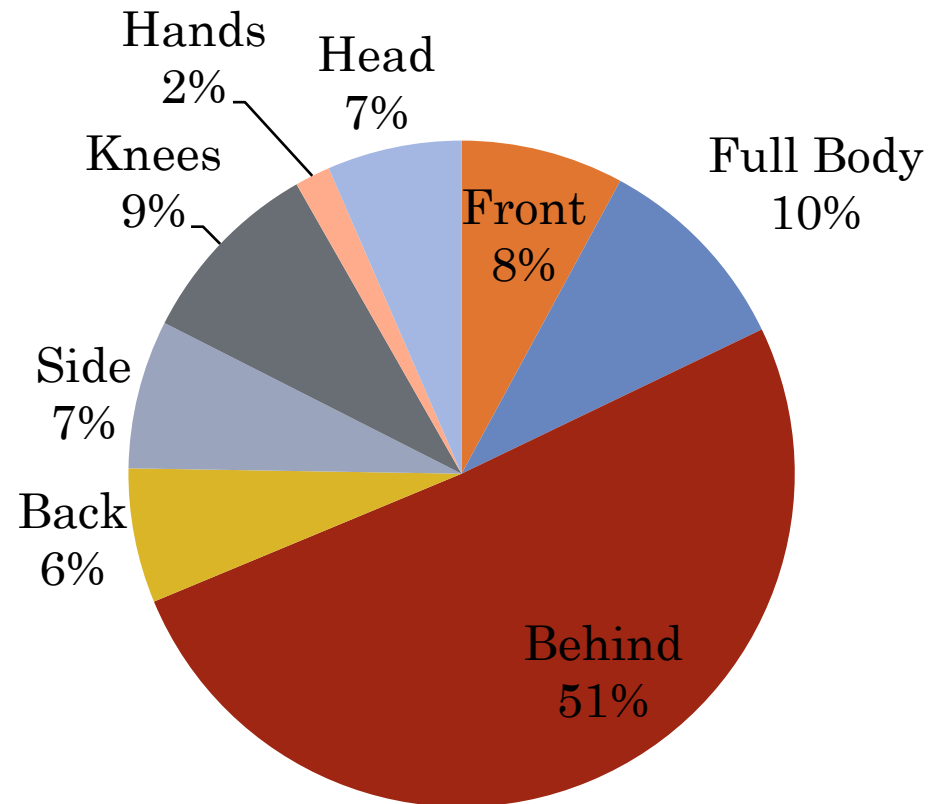
Helmet Use - Gender



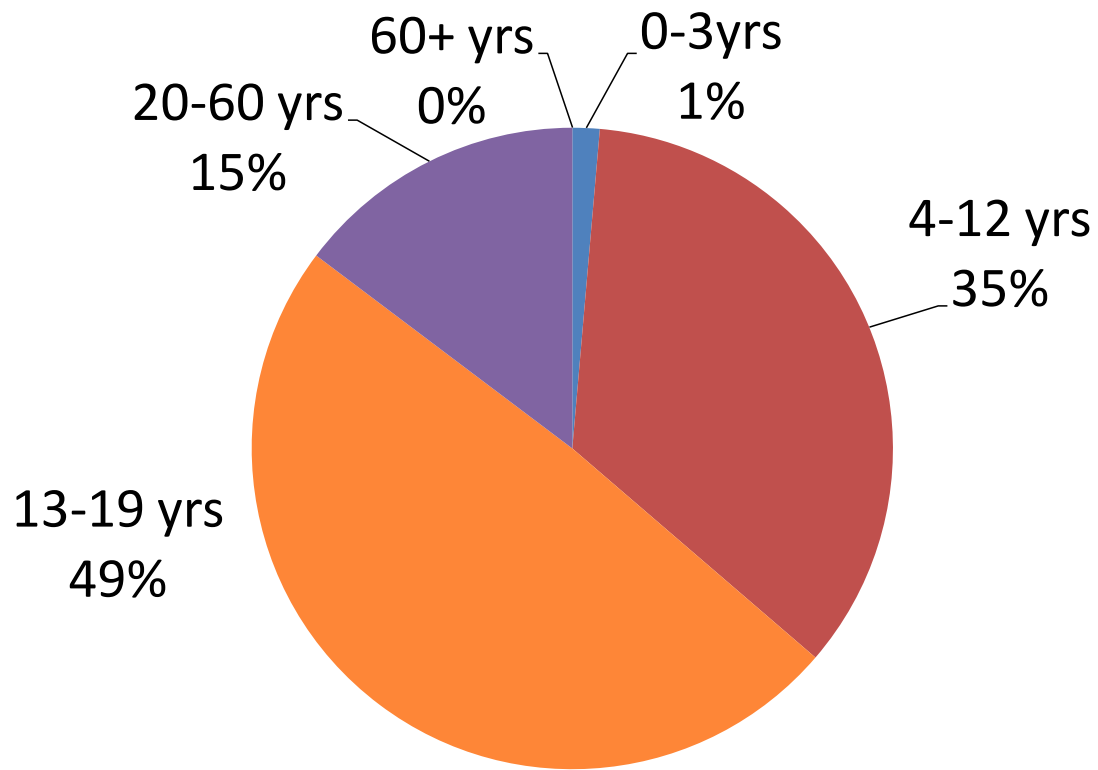
Falls and Helmet Use

- 292 falls
- 17 % of falls - not wearing helmet

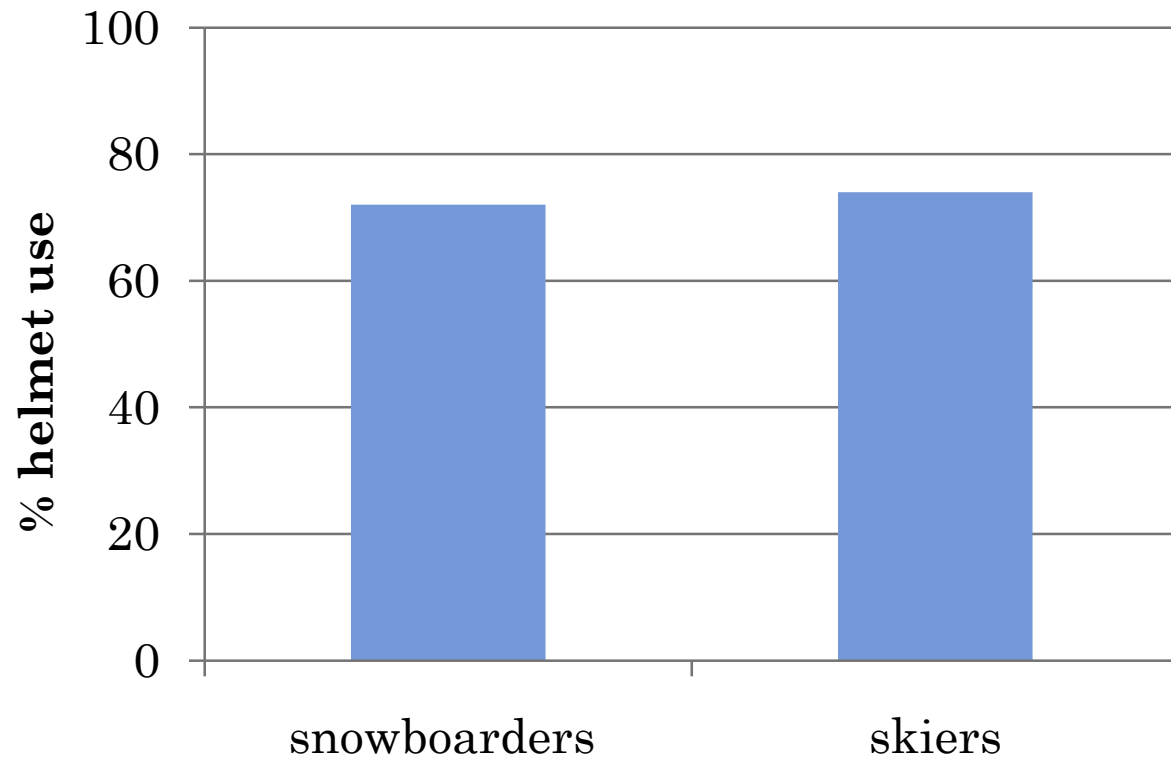
Falls - Area of Impact



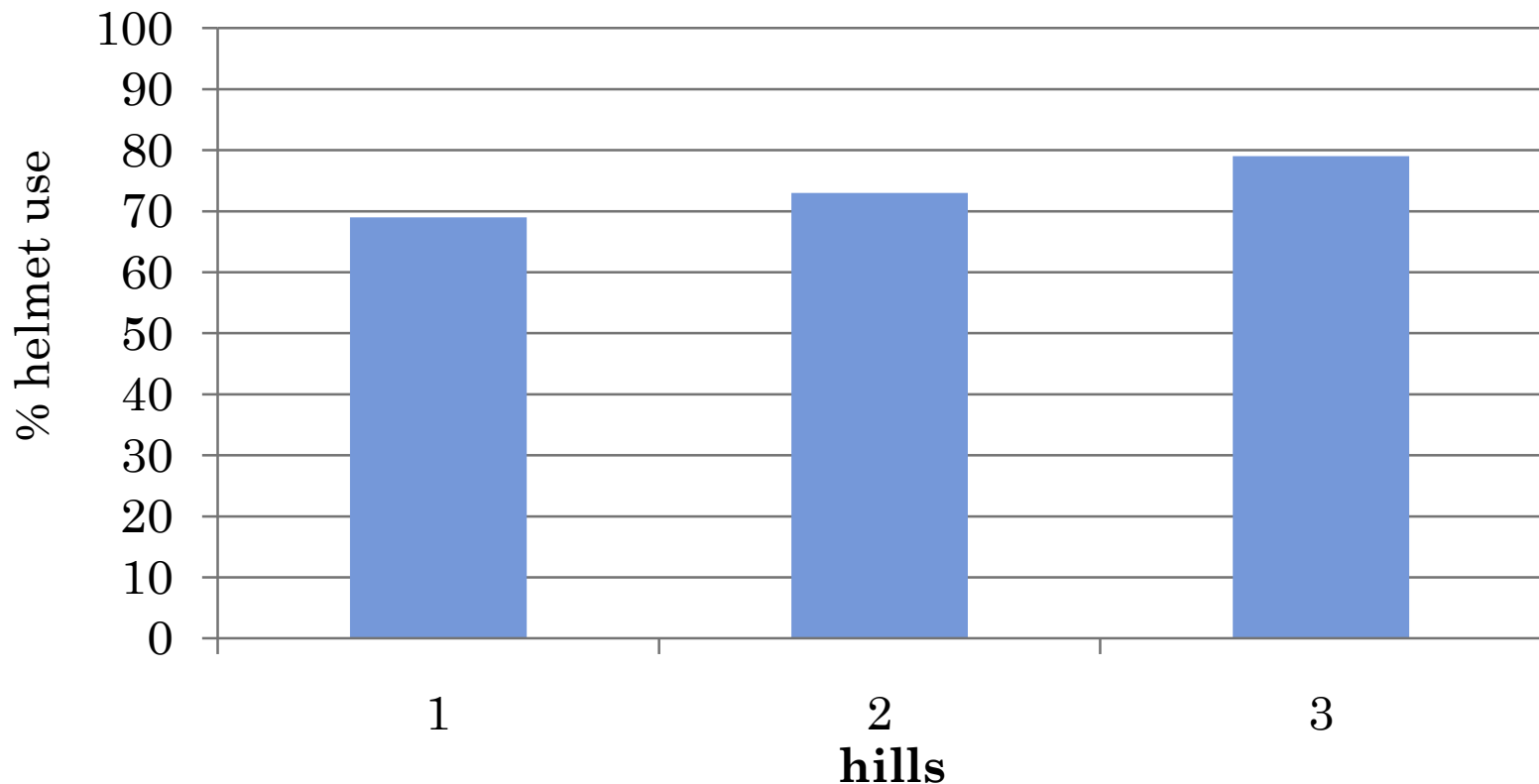
Falls – Age



Helmet Use - Skiers and Snowboarders



Helmet Use on Different Hills in Nova Scotia



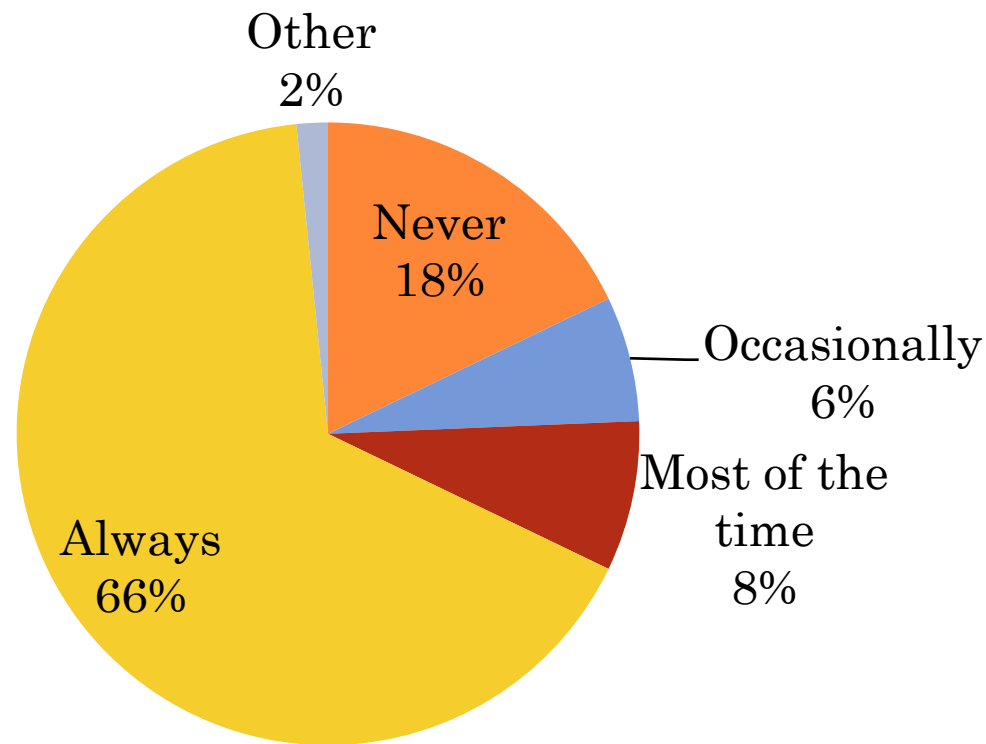
Differences in Helmet Use per Hill

- There were significant differences in the percentage of helmet use between hills

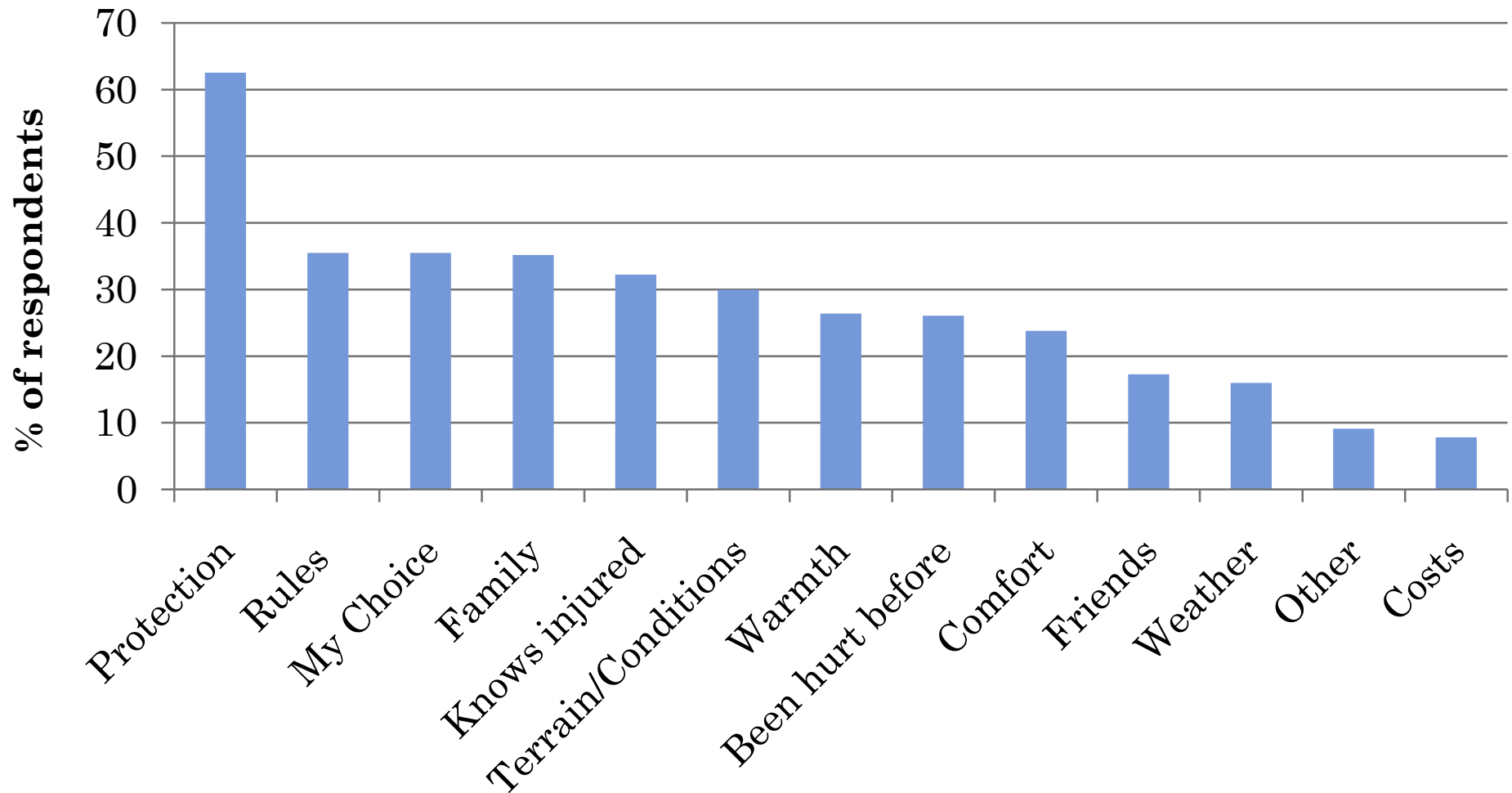
Qualitative Survey

- 100 + surveys completed per hill
- Surveys were administered
 - helmet use
 - factors which influence decision to wear helmets

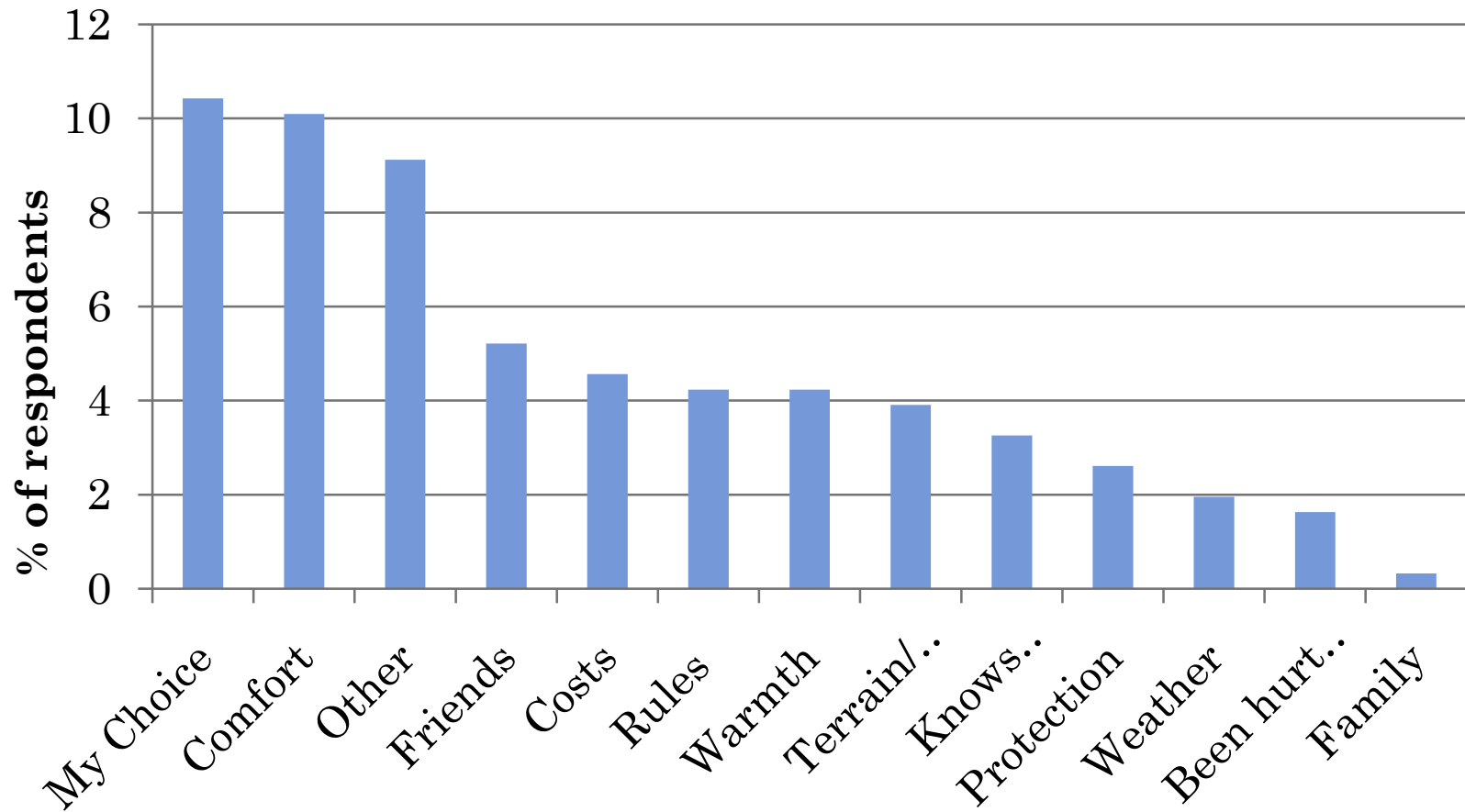
Self-Described Frequency of Helmet Use



Factors – Decision to Wear Helmet



Factors – Decision not to Wear



Education and Awareness

- Educational displays present during the helmet observation studies and during formal education sessions
- 2 education sessions per hill:
 - developed by Neurosurgeons
- Prizes such as free helmets were drawn at the end of the sessions
- Support provided for project by Health Promotion and Protection

Conclusions Ski/Snowboard Study

- Final analysis of data is pending
- Women more likely than men to wear helmets
- Differences between ski hills Hill 1, 2, 3
- Main reason cited for helmet use was protection
- Main barrier cited for helmet use – personal choice

Ski and Snowboard Helmets

- Next steps
 - Complete data analysis
 - Share findings with ski hills and all stakeholders
 - Determine next steps, based on research findings, in consultation with stakeholders
 - Mandatory policy or legislation

Thank You for Your Time



- Health Promotion and Protection
- Dr. David Clarke & Dr. Simon Walling.
- Lynne Fenerty, Ginette Thibault-Halman, Paula Dunn
- Ski Hills (Ski-Martock, Ski-Wentworth, Ski-Ben-Eoin).
- ThinkFirst Canada
- Volunteers



Capital Health

