

## CYCLING INJURIES IN CHILDREN

### Introduction

Unintentional injuries are a leading cause of death and hospitalization among children ages 1 to 14 in BC <sup>1,2</sup>. The most common causes of injury hospitalizations are falls, being struck by or against objects, motor vehicle crashes and cycling related injuries. Much emphasis and effort is being placed on increasing physical activity among children as it is known to promote health and prevent obesity. It is also important in the development of social behavior, enabling children to interact with their peers. However, with this increase in physical activity, there is also an increase in the risk of injury. It is therefore important to ensure that safety measures are taken to prevent these injuries.

In BC, it is mandatory for all cyclists to wear a helmet, yet only 59% report using a helmet <sup>3</sup>. Cycling injuries are estimated to result in emergency department visits and hospitalizations at an annual rate of 482 per 100,000 and 34 per 100,000, respectively; amounting to some \$25 million in provincial healthcare costs <sup>4</sup>.

This publication illustrates the trends, patterns and prevention of cycling related injuries among children ages 1 to 14 years.

### WHAT WE KNOW FROM RESEARCH ...

Correctly fitted bicycle helmets are effective in preventing injury to the head and face <sup>5,6,7</sup>

- Bicycle helmets with chin protection can prevent injury to the lower face and jaw <sup>5</sup>
- Parental knowledge and helmet availability, accessibility, cost and ease of use all influence proper helmet use <sup>7</sup>
- Having peers and adults model proper helmet use is effective in increasing use among children <sup>8</sup>
- Consider children's attitudes towards helmets and helmet wearing when designing promotional campaigns <sup>9</sup>
- Strategies that work to increase helmet use include <sup>7, 8, 10, 11, 12</sup>
  - provision of bicycle paths and lanes <sup>7</sup>
  - bicycle traffic lights; and bicycle crossings <sup>7</sup>
  - community-based programs and interventions
  - provision of free or subsidized helmets
  - provision of free helmet and fitting with each purchase of a bicycle
  - in-school interventions
  - seizure of bicycles from cyclists not wearing helmets



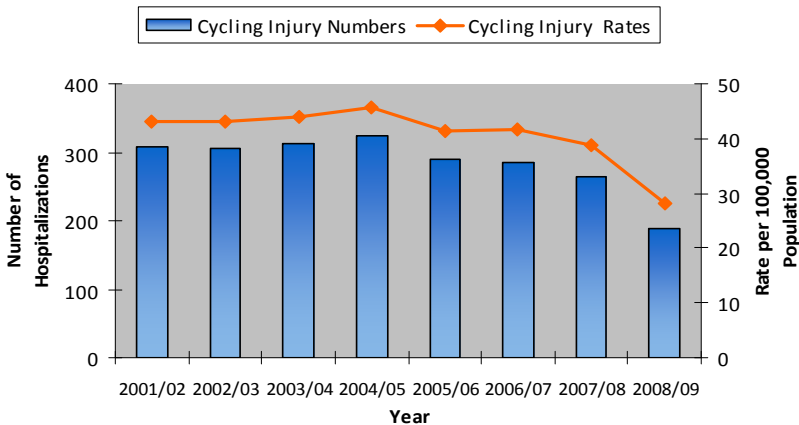
### KEY OPPORTUNITIES FOR PREVENTION ...

- Targeted parent education campaigns promoting the benefits of bicycle helmets, and modeling their correct and appropriate use <sup>13</sup>
- Targeted school campaigns promoting the benefits and correct use of bicycle helmets <sup>13</sup>
- Ensure increased enforcement of bicycle helmet use legislation <sup>6</sup>
- Continued development of dedicated bicycle paths and lanes <sup>7</sup>

## Hospitalizations due to Cycling Injuries

- Since 2000/01 (Figure 1), the number and rate of cycling injury hospitalizations among children ages 1 to 14 years have decreased by approximately 35 %
- The average length of hospital stay as a result of a cycling injury ranges from 2 to 3.5 days, providing some indication to the severity of the injury
- Children ages 1 to 4 years are seen to spend more days in the hospital as a result of a cycling injury than older children

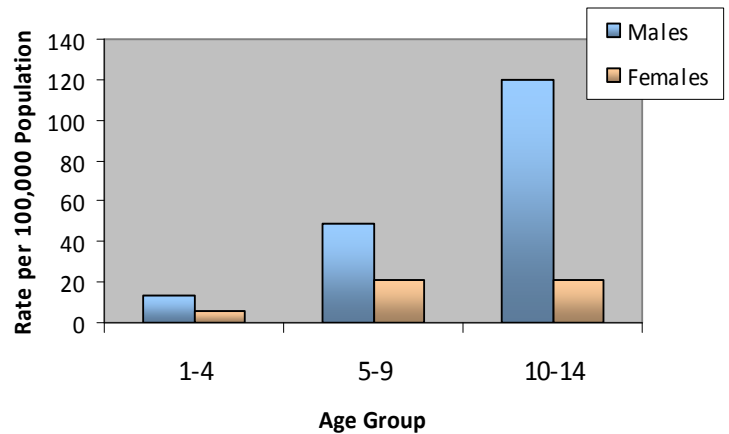
**Figure 1: Number and Rate of Hospitalizations\*, Cycling Injuries, Ages 1-14 Years, by Year, BC, 2001/02 - 2008/09**



\*Age standardized rates using 1991 Canadian population

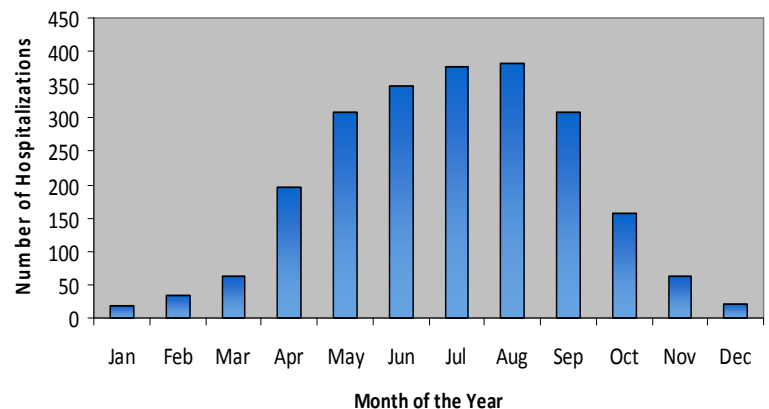
- Of all cycling injuries, 11 % resulted from a crash with motor vehicle
- The leading types of injury for all three age groups are:
  - Fractures (63%)
  - Intracranial injuries (15%)
- The leading body part injured for all three age groups are:
  - Elbow and Forearm (31.9%)
  - Abdomen, lower back and pelvis (11.2%)
  - Head (11%)
  - Shoulder and upper arm (10.5%)
  - Knee and lower leg (10.1%)

**Figure 2: Rate of Hospitalizations, Cycling Injuries, Ages 1-14 Years, by Age Group and Sex, BC, 2001/02 - 2008/09**



- The hospitalization rates for cycling injuries are higher for males than females in all age groups and peaked among those children ages 10 to 14 years (Figure 2)
- Hospitalizations from cycling injuries peak in July and August (Figure 3)

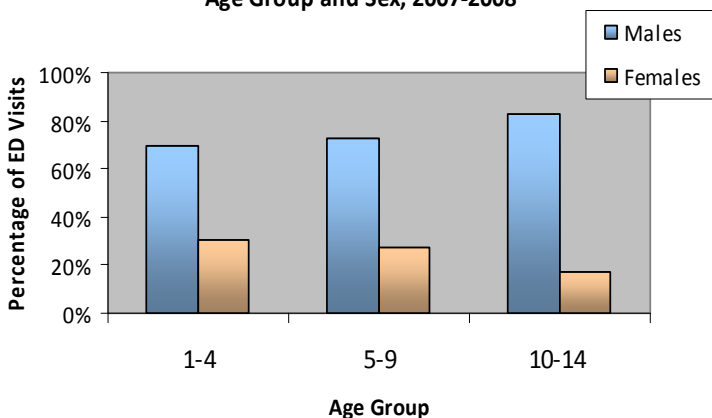
**Figure 3: Hospitalizations, Cycling Injuries, Ages 1-14 Years, by Month of the Year, BC, 2001/02 - 2008/09**



## Emergency Department Visits to BC Children’s Hospital due to Cycling Injuries

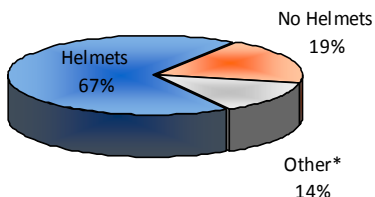
- Emergency department visits to BC Children’s Hospital for cycling injuries are higher for males than females in all age groups (Figure 4)

**Figure 4: Percentage of Emergency Department Visits to BC Children's Hospital, Cycling Injuries, Ages 1-14 Years, by Age Group and Sex, 2007-2008**



- Only 68% of children are wearing helmets at the time that they are injured (Figure 5)

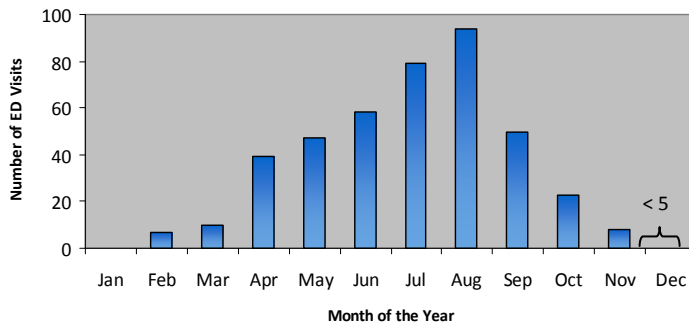
**Figure 5: Percentage of Helmet Use in Cycling Injuries, Emergency Department Visits to BC Children's Hospital, Ages 1-14 Years, 2007-2008**



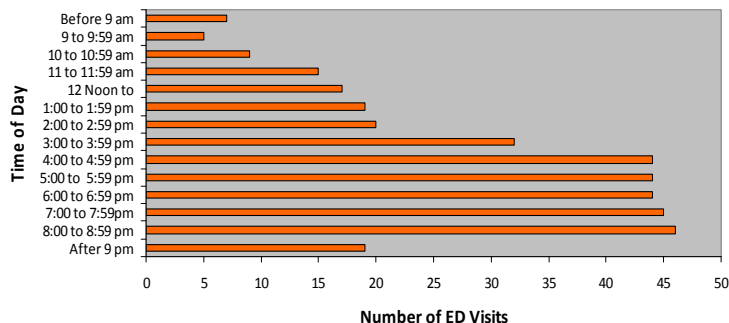
\*Other includes sports padding, protective clothing and protective eyewear or face mask

- Of the cycling injuries treated at the BC Children’s Hospital Emergency Department, the most common were superficial injuries (32%) and fractures (29%)
- The most common body parts injured are elbow and forearm (18%), and wrist, hand and finger/thumb (16%)
- Of these injuries, the vast majority were treated and released, with follow-up required (70 - 83%). Only a small number of cases were admitted to hospital as a result of their injuries
- Emergency department visits due to cycling injuries peak during the summer months in July and August (Figure 6). Cycling injuries occur more commonly on weekends and more often after school hours, i.e. after 3:00 pm (Figure 7)

**Figure 6 : Emergency Department Visits to BC Children's Hospital, Cycling Injuries, Ages 1-14 Years, by Month of the Year, 2007-2008**



**Figure 7: Emergency Department Visits to BC Children's Hospital, Cycling Injuries, Ages 1-14 Years, by Time of Day, 2007-2008**





## Methods

- Data were obtained through the Discharge Abstract Database (DAD) from the BC Ministry of Health and the emergency department data from the BC Children's Hospital (BCCH) through the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP)
- Data for cycling injuries for ages 1 to 14 years from 2001 to 2008 were extracted from DAD and data from 2007-2008 were extracted from CHIRPP. Hospitalization information on injuries in the DAD is recorded using the International Classification of Disease version 10 codes (ICD-10). The codes V10 to V19 were extracted from the DAD for cycling injuries. The admission date was used to identify the month and year of injury. Other information obtained from the DAD included demographics such as age and sex of the patient hospitalized as well as the type of injury incurred, and the length of stay in hospital
- In the CHIRPP database, context code 13 (bicyclists) was used to filter out the cases, as well as a text search in the narrative field for "cyclist" or "bicyclist" was also conducted. The cycling injuries varied from colliding with a pedestrian, animal, other cyclist, motor vehicle, railway train, fixed object, or injuries sustained when boarding the cycle

## Analyses

- Hospitalizations from cycling were investigated by year, month, age group, type of injury and average length of stay. Rates were calculated by age group
- Emergency visits to BC Children's Hospital due to cycling injuries for ages 1-14 years were investigated by time of occurrence, month, age group, type of injury, body part injured and bicycle helmet use

## References

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