

# **The Location of Child Cyclist Versus Motor Vehicle Collisions in an Urban Environment**

***Linda Rothman, BScOT, MHSc, Andrew Howard, MD, FRCSC, MSc***

The Hospital for Sick Children, Toronto, Canada  
Child Health Evaluative Sciences (CHES)

# BACKGROUND

- 75% of Canadian children ages 5+ reporting riding a bicycle at least once in previous 12 months.<sup>1</sup>
- Cyclists disproportionately represented in motor vehicle collisions
- In 2007, cyclists represented 2.3% of fatalities and 3.1% serious injuries related to motor vehicle collisions, with proportions increasing over previous 5 years.<sup>2</sup>
- Younger cyclists higher fatality and serious injury rates than average for all ages.<sup>3</sup> Children <16, accounted for greatest proportion of fatally injured cyclists from 2004-2006.<sup>4</sup>
- Children of different ages use bicycles for different purposes resulting in variation in environmental risk factors.

1. Cragg, S., Cameron C., and Craig, C.L. (2006) 2004 National Transportation Survey. Ottawa, ON: Canadian Fitness and Lifestyle Research Institute

2. Canadian Motor Vehicle Traffic Collision Statistics: 2007. Transport Canada. TP 3322, 2010

3. Vulnerable road user safety: A Global Concern, Transport Canada, Road Safety Fact Sheet TP2436 E RS-2004-03E March 2004

4. A Quick Look at Fatally Injured Vulnerable Road Users. Transport Canada. Fact Sheet TP 2436E RS-2010-02 June 2010

# OBJECTIVE

- To determine the age-specific variation in location of cyclist versus motor vehicle collisions in children ages 1-17 in Toronto, Canada in order to identify possible age-specific prevention strategies for children.



# METHODS

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- Data Sources:
  - City of Toronto's Traffic Data Center and Safety Bureau, Police Reported Collisions.
    - Motor vehicle collisions involving cyclists, ages 1-17 from January 1, 2000 - December 31, 2005.
    - Age groups: 1-4, 5-8, 9-12, 13-17
    - Intersection (vs midblock), crossing control
    - Major versus neighbourhood road: Longitudinal/latitudinal coordinates plotted onto Toronto map using ArcGIS software
  - 2001 census data, Statistics Canada: Rates calculated
- SPSS used to calculate odds ratios between age groups.

# RESULTS

- Total of 1325 reported child cyclist collisions, Jan. 1, 2000 - Dec. 31, 2005.



| Age   | Number (%)  |
|-------|-------------|
| 1-4   | 20 (1.5%)   |
| 5-8   | 162 (12.2%) |
| 9-12  | 390 (29.4%) |
| 13-17 | 753 (56.8%) |

# RESULTS cont'd.

## Child Cyclist and Motor Vehicle Collisions: Rates/100,000

| Year | Age Groups |       |        |         |          |
|------|------------|-------|--------|---------|----------|
|      | 1 – 4      | 5 – 8 | 9 – 12 | 13 – 17 | All Ages |
| 2000 | 1.39       | 28.96 | 62.86  | 97.38   | 47.24    |
| 2001 | 2.79       | 24.82 | 69.85  | 84.49   | 44.74    |
| 2002 | 1.39       | 19.86 | 65.48  | 97.38   | 45.70    |
| 2003 | 2.79       | 20.68 | 48.02  | 93.80   | 41.46    |
| 2004 | 2.09       | 24.82 | 48.02  | 89.50   | 41.07    |
| 2005 | 3.48       | 14.89 | 46.27  | 76.61   | 35.29    |

*Denominators from 2001 Census as follows:*

1-4: 143,515, 5-8: 120,870, 9-12: 114,535, 13-17: 139,665

## RESULTS cont'd.

### Location of Collision by Age, Unadjusted Odds Ratios

|          | Major Road  |                                     | Intersection |                                     | Crossing Control |                                     |
|----------|-------------|-------------------------------------|--------------|-------------------------------------|------------------|-------------------------------------|
|          | Number (%)  | Odds Ratio (95% CI)                 | Number (%)   | Odds Ratio (95% CI)                 | Number (%)       | Odds Ratio (95% CI)                 |
| 5-8 ref. | 49 (30.2%)  | 1.000                               | 54 (36.2%)   | 1.000                               | 47 (29.2%)       | 1.000                               |
| 9-12     | 170 (43.6%) | <b>1.78*</b><br><b>(1.21-2.63)</b>  | 227 (63.2%)  | <b>3.03**</b><br><b>(2.03-4.50)</b> | 215 (55.3%)      | <b>3.00**</b><br><b>(2.02-4.45)</b> |
| 13-17    | 466 (61.9%) | <b>3.74**</b><br><b>(2.60-5.40)</b> | 504 (69.7%)  | <b>4.05**</b><br><b>(2.80-5.86)</b> | 484 (64.4%)      | <b>4.38**</b><br><b>(3.02-6.35)</b> |

\*  $p < 0.005$ , \*\*  $p < .001$

# DISCUSSION

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- Rates increase with increasing age, largest burden 13-17
  - Decreased parental supervision
  - Riskier cycling behaviour
  - More likely to be on roads
- There was a downward trend in cycling collisions that were reported in children over the six year period
  - Better cycling environment in the city?
  - More likely less exposure



# DISCUSSION CONT'D

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- Older children (13-17) greater odds on major roads, at intersections and crossing controls
  - use more as transportation, on roadways, similar collision patterns to adults
- Younger children (ages 5-8) greater odds on neighborhood roads, midblock, no crossing controls.
  - use more for recreation.
- 9-12 year olds, more of a mix

# LIMITATIONS

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- Police report collision data
  - May be underreported – especially bicycle collisions, and children
  - Did not specify in database where midblock collisions occurred (on road, off roadway, in driveway, on sidewalk)
- Lack of exposure data- essential in order to understand downward trends.

# CONCLUSIONS

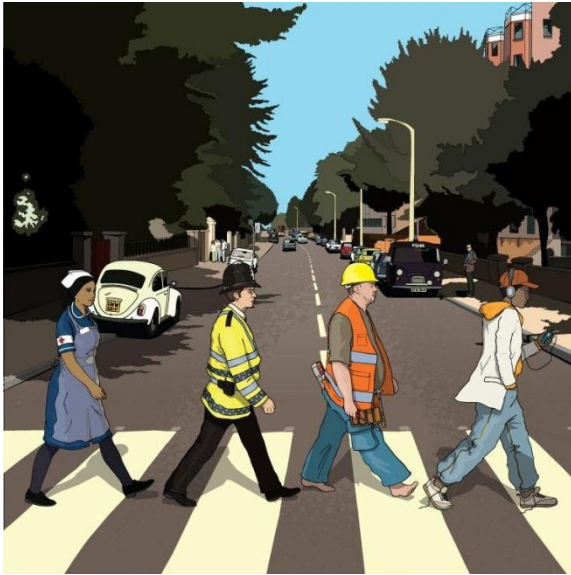
- Focus of intervention programs-  
Important to consider age of children
  - Older children
    - Evidence-based physical environmental modifications on major roadways that work for children
    - Specific education regarding safety when cycling in traffic
  - Younger children
    - More off-roadway options (ie bike paths), to keep children off roadways until ready to negotiate traffic.



# Safer Roads for Safer Cycling....

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