



Influence of Crossing Controls and Crossing Location on Severity of Injury Among Urban Pedestrians

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

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

Safety 2010 World Conference, Thursday, September 23, 11:30-3:00,
Abbey Room F-4 Pedestrian Safety

BACKGROUND

- Downward trend in fatalities and severe injuries from road traffic crashes in Canada, however, pedestrian collisions continue to be significant burden especially in urban areas
- 2007 Canada¹
 - 376 pedestrian fatalities, 1,674 severe injuries
- 2004-2005 Canada
 - 2,507 pedestrians hospitalized, accounting for 13% of all hospitalizations due to MVA²
- 2004-2006 Canada³
 - 75% of pedestrian traffic fatalities occurred on urban roads

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

2. Canadian Institute for Health Information. *National Trauma Registry 2006 Injury Hospitalizations Highlights Report, May 2007*

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



BACKGROUND

- Crossing controls, effective in reducing pedestrian injury risk
- Location
 - Younger children (<5) more at risk midblock, older children, more at risk at intersection¹
 - Younger children (ages 0–9) more frequently severely injured on neighborhood roads compared with adults and older children, who are more frequently severely injured on major roads²



1. Lightstone, A.S. Dhillon, P.K. Peek-Asa, C. Kraus JF. A geographic analysis of motor vehicle collisions with child pedestrians in Long Beach, California: comparing intersection and midblock incident locations. *Inj Prev* 2001;7:155-160.
2. Rothman, Linda , Slater, Morgan , Meaney, Christopher and Howard, Andrew(2010) 'Motor Vehicle and Pedestrian Collisions: Burden of Severe Injury on Major Versus Neighborhood Roads', *Traffic Injury Prevention*, 11: 1, 43 — 47

OBJECTIVE

- To determine the relationship between severity of pedestrian injury and presence of crossing controls at intersections and midblock locations in the City of Toronto



METHODS

- Data sources:
 - City of Toronto's Traffic Data Centre and Safety Bureau (January 1, 2000 to December 31, 2005) Police-reported motor vehicle vs. pedestrians collisions
 - 2001 Census from Statistic Canada
 - Primary Outcomes
 - Injury Severity
 - No injury
 - Minimal injury- no hospital visit
 - Minor injury-treated in ED, not admitted
 - Major injury-required hospital admission
 - Fatal-died within 30 days as result of collision
 - Severe injury: major or fatal injury versus other
 - Fatal injury: fatal injury alone versus other

METHODS cont'd

- **Covariates:**
 - Location
 - Intersection versus midblock
 - Traffic control
 - Traffic control: traffic signals, stop and yield signs, pedestrian crossing and police and school guards versus none
 - Age
 - Children: under 18 years old
 - Adults: 18 – 64 years old
 - Seniors: 65 years and older
- Logistic regression used to assess age-specific relationships between injury severity and location of the collision and presence of a traffic control

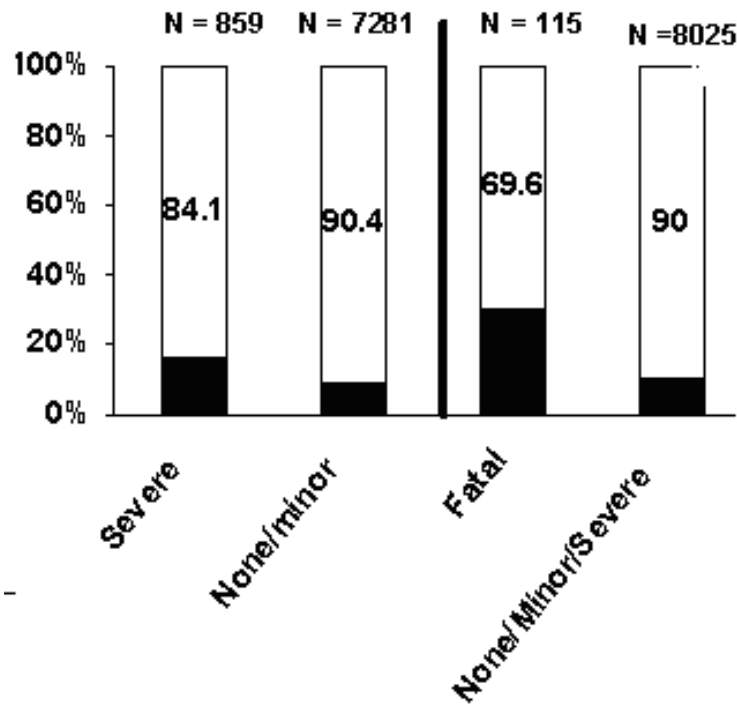
RESULTS

Average Yearly Rates (2000 – 2005)

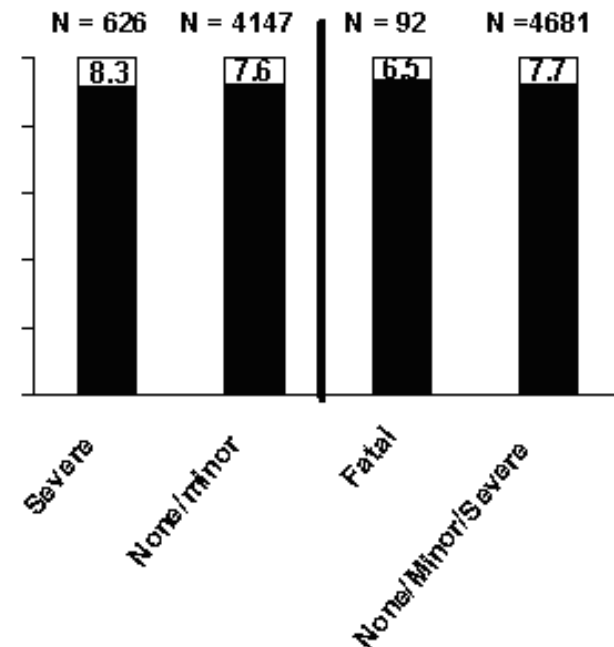
	Count	Overall Rate/100,000 (95% CI)	Count	Severe Rate/100,000 (95% CI)	Count	Fatal Rate/100,000 (95% CI)
Children	453	87.3 (79.3-95.4)	40	7.7 (5.3-10.1)	2	0.4 (0.0-0.9)
Adults	1577	97.0 (92.3-101.8)	159	9.8 (8.3-11.3)	16	1.0 (0.5-1.5)
Senior	298	86.7 (76.8-96.7)	64	18.9 (14.3-23.6)	17	5.0 (2.6-7.4)
Overall	2446	98.6 (94.7-102.5)	273	11.0 (9.7-12.3)	35	1.4 (0.9-1.9)

Proportions of Collisions by Severity, Location and Traffic Control

Intersections



Midblock



■ No Traffic Control □ Traffic Control

Odds of Severe and Fatal Injury

Logistic Regression

	Severe Injury			Fatal Injury		
	N	Exp (B)	95% C.I.	N	Exp (B)	95% C.I.
Intersection (with control)	72	Reference		80	Reference	
Midblock (with control)	52	1.50	1.11, 2.03	6	1.50	0.65, 3.45
Intersection (no control)	137	1.78	1.46, 2.18	35	3.94	2.63, 5.90
<i>Interaction term</i> (Midblock (no control))	574	1.37	1.21, 1.60	86	1.80	1.62, 2.27

DISCUSSION

- Rate of motor vehicle vs. pedestrian collisions: 98.6/100,000
 - Injuries 11.0/100,000 – problems with comparison
 - U.S. 23/100,000
 - Overall Ontario 43.3/100,000 (2001)
 - Fatality 1.4/100,000 in line with :
 - U.S. 2.1/100,000
 - Netherlands 1.9/100,000
 - Ontario 1.0/100,000 (2001)
- Adults (18-64) had highest collision rate
- Seniors (65+) had highest severe and fatal collisions



DISCUSSION Cont'd...

- Burden of fatal injury:
 - Midblock no control- 86
 - Intersection with control - 80
 - Intersection no control- 35
 - Midblock with control- 6
- Severe and fatal generally more likely at any other configuration other than controlled intersections
- More fatalities at locations without traffic controls
- Highest odds of fatalities at intersection with no controls
- Midblock control not as effective as intersection controls

DISCUSSION

- Severity higher at uncontrolled locations, and at midblock crossing
- Contrary to intersection controls, midblock controls don't appear to work
- Future work
 - Analysis done by age, focusing on children, seniors
 - Look specifically at what is happening at midblock, and types of crossing controls

LIMITATIONS

- Police data underestimates the number of motor vehicle collisions
 - More severe traffic-related incidents requiring hospital care are more likely to be reported to police
- No measure of exposure for evaluating the collision risk for different conditions

CONCLUSION

Crossing controls decrease odds of severe and fatal injuries at intersections, but not at midblock crossing locations where a large proportion of the fatality burden lies.

