Association between parent perception of traffic danger, walking to school and the built environment

May 28 , 2015

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BACKGROUND

- Why examine parent perceptions of dangerous traffic?

BACKGROUND

- Decreases in child pedestrian collisions[1]
  - 1994-2004: ↓ 52%, in Canada
- Are there fewer collisions because children walking less?[2]
  - 1986: 53% 2006: 43%
- Only 38% of Canadian children use any active school transportation (2013)[3]
- Walking to school is an important source of physical activity
  - Parents are the key decision makers
  - Parent perceptions of traffic safety a key factor[4]
    - Poorly understood

1. Canadian Institutes of Health Information, 2007.
2. Buliung R et al. Prev Med. 2009.
3. Active Healthy Kids Canada. Is Canada in the running? 2014.
4. Mcmillan TE. J Plan Lit. 2005.

OBJECTIVES

- **Objective 1**

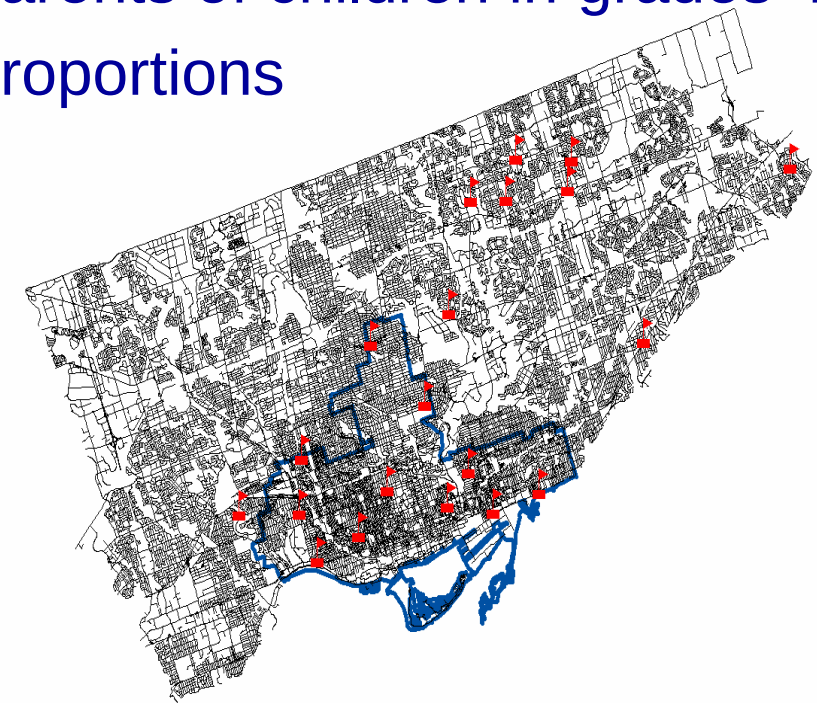
To determine if parent perceptions of traffic danger en route to school and/or at the school site during morning drop-off are related to walking to school

- **Objective 2**

To examine the relationship between features of the built environment and parent-perceived traffic danger

METHODS

- 20 primary schools randomly selected
  - 10 each from the older center of Toronto versus newer inner ring suburbs
  - Within each of these geographic strata, 2 schools from every ATLICO quintiles were randomly selected to control for SES
- Written questionnaires from parents of children in grades 4-6, and observational counts of proportions walking in Spring 2011



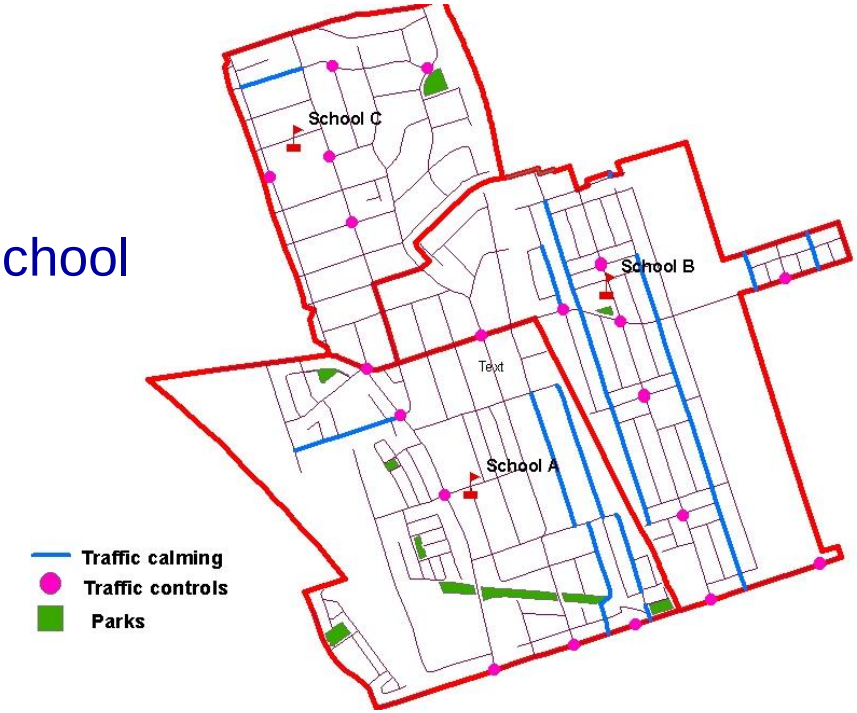
METHODS: Outcomes

- **Reported walking to school**
  - Dichotomized
  - Frequent walking to school (4-5 times/weekly), versus walks 0-3 times/weekly

- **2 measures of parent perception of traffic danger**
  - **"***How dangerous is the traffic for your child…*
    1. *Between your home and your child's school? (ROUTE)*
    2. *Around the school during drop-off time?" (SITE)*
  - Visual analogue scales, from 1 (none) to 7 (extreme) dichotomized
    - 4+ indicating high danger perception, versus low

METHODS: COVARIATES

- Data Sources
  - School site surveys
  - School web sites
  - City of Toronto Databases
  - MPAC land use database
  - Canadian census
  - Police-reported collision data
- Built environment data mapped onto school attendance boundaries



METHODS: COVARIATES

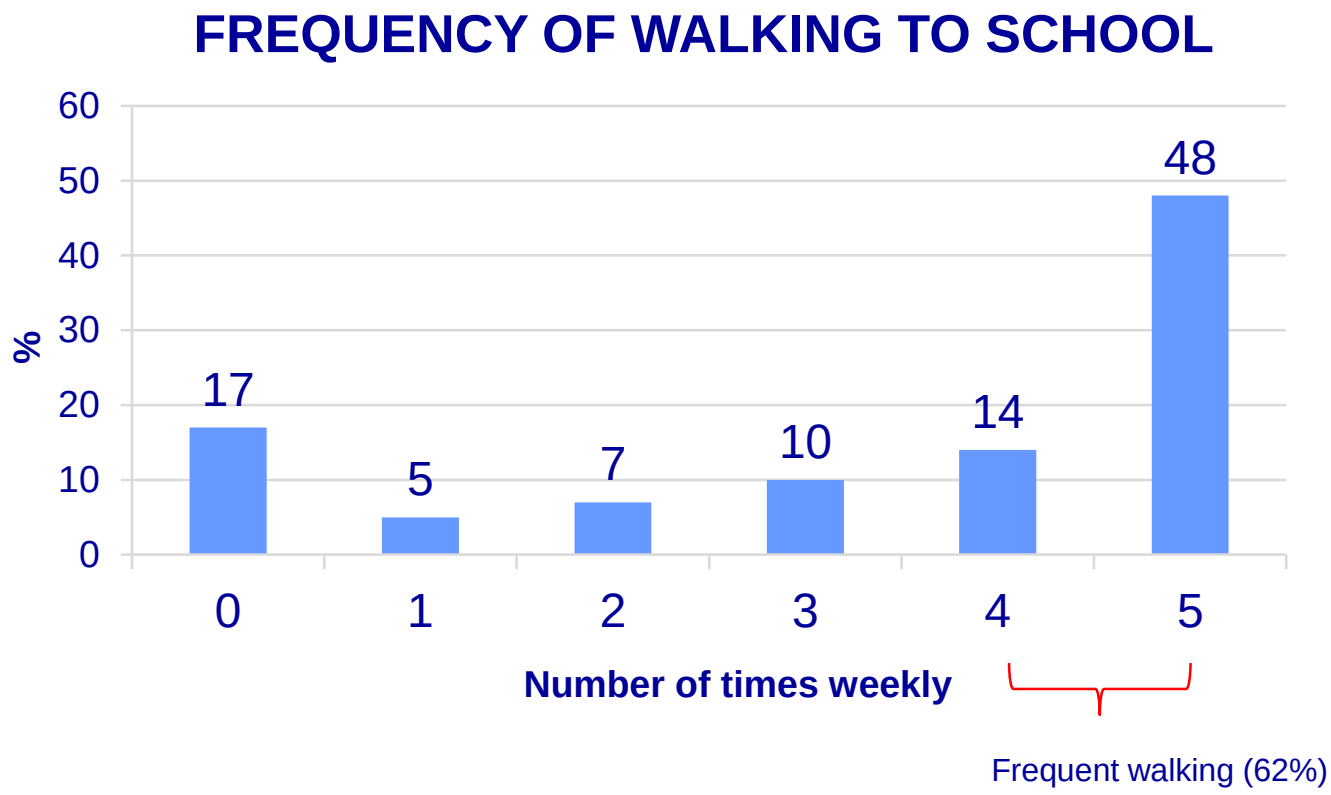
- Built environment classified according to 3 D's[5]
  - Density: Child population, multi-dwelling density
  - Diversity: Land use mix, proportions of residential, recreational etc
  - Design:
    - Route: flashing beacons, crossing guards, road type, dead ends, trails, sidewalks, traffic controls
    - School site: double parking, school crossing guard, traffic congestion

[5] Cervero R, Kockelman K. Trans Res Part D., 1997

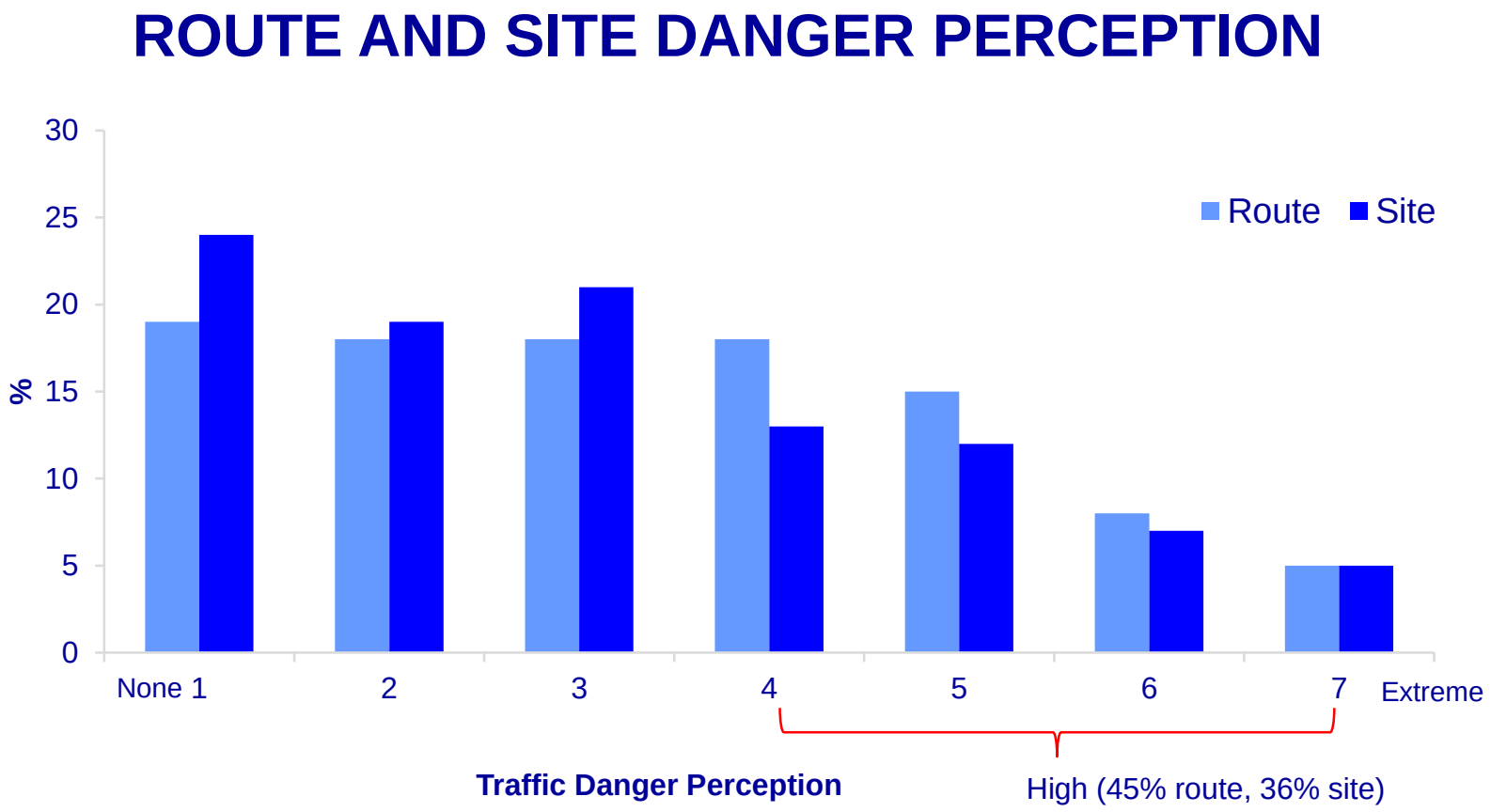
METHODS: ANALYSIS

- **Objective 1: High *route and site perceptions of traffic danger and walking to school***
  - 2 logistic regression models (route, site), with repeated-measures to account for clustering by school
  - Controlling for grade, sex, reported distance to school and vehicle access
- **Objective 2: *The built environment and high parent-perceived traffic danger***
  - Logistic regression model with repeated measures to account for clustering by school

RESULTS


FREQUENCY OF WALKING TO SCHOOL
60
50
40
30
20
10
0
%
17
5
7
10
14
48
0
1
2
3
4
5
Number of times weekly
Frequent walking (62%)

RESULTS


ROUTE AND SITE DANGER PERCEPTION
30
25
20
15
10
5
0
%
Route
Site
None 1
2
3
4
5
6
7
Extreme
Traffic Danger Perception
High (45% route, 36% site)

RESULTS

- Response rate 38% (n=733 surveys)

Variable	N (%)
Distance to school ≤1 km	188 (74.3%)
Access to car	587 (82.4%)
Frequent walker (4-5 times weekly)	407 (61.5%)
High dangerous route perception	332 (45.4%)
High dangerous site perception	259 (36.4%)

RESULTS

- Strong correlation between reported walking and observed walking (SRCC = 0.77)
- Moderate correlation between dangerous route and site (Pearson's r = 0.43)
- No relationship between dangerous site perception and walking to school
- Therefore, focus on dangerous route perception

RESULTS

Correlates of frequent walking to school (walking 4-5 times/week)

	Adjusted Odds Ratio (95% CI)
Outcome	
Frequent walker (walking 4-5 times/week)	
High dangerous route perception	
No	1.00
Yes	**0.53 (0.37, 0.76)**
Distance far	
< 1 km	1.00
>= 1 km	0.17 (0.12, 0.26)
Access to car	
No	1.00
Yes	0.18 (0.10, 0.33)

- Dangerous route perception was associated with a 47% less likelihood of frequently walking to school

RESULTS

Built environment correlates of perception of dangerous route

	Variable	Adjusted Odds Ratio (95% CI)
Outcome	High perception route danger (y/n)	
BUILT ENVIRONMENT		
Features related to high danger perception		
Design	Flashing beacons (#)/km roads	1.31 (1.10, 1.56)
	Dangerous midblock crossings observed	1.97 (1.52, 2.57)
Features related to low danger perception		
Design	Dead-end (#)/ 10 km roads	0.70 (0.62, 0.79)
	Crossing guard (#)/10km roads	0.80 (0.68, 0.94)
	Collector roads km/10 km roads	0.81 (0.72, 0.92)
	Traffic light #/10km roads	0.86 (0.82, 0.90)

STRENGTHS AND LIMITATIONS

- Strengths
  - Multivariate modeling controlling for
    - clustering by school
    - geographic location
    - SES
- Limitations
  - Only elementary schools, spring
  - Low response rate and possibility of selection bias
  - Collision data – over 10 years, Danger perception – 2011
  - Cross sectional data

DISCUSSION

- High dangerous route perceptions were negatively associated with frequent walking
- No association between high dangerous site perceptions and frequent walking
- High route danger perceptions were not associated with
  - Population density
  - Land use diversity
  - Actual collision rates
- High route danger perceptions were associated with
  - Dangerous midblock crossing, higher speed roadways
  - Flashing lights
- Parents perceptions of traffic danger may not accurately represent actual traffic risks

DISCUSSION

- The location of perceived danger matters
  - focused en-route rather than the school site
- To influence walking, the safety of the built environment along the school route must be considered
- However, contrary to what parents may perceive, safety interventions must also focus immediately surrounding schools
- Issues regarding the built environment must be addressed to influence
  - parent perceptions of safety to promote walking AND
  - ensure the safety of children on their trips to school

ACKNOWLEDGEMENTS

- **Data**
  - City of Toronto, Transportation Services

- **Funding**
  - Hospital for Sick Children
    - *Restracomp Research Training Award*
  - Ontario Neurotrauma Foundation (ONF)
    - *Summer Internship Program in Injury Prevention*
  - CIHR
    - *Doctoral Research Award*
    - *Strategic Teams in Applied Injury Research (STAIR)*
      - *Traffic and road injury prevention program (Dr Andrew Howard, Dr. Anne Snowdon)*
      - *CIHR Chair in Child and Youth Health Services and Policy Research (Dr. Alison Macpherson)*