The association between the built environment and bicycling injuries in children

A case-crossover pilot

Mairead Whelan (Presenter), Tate Hubka, Antonia Stang, Carolyn Emery, Stephen Freedman, Andrew Howard, Alison Macpherson, Gavin McCormack, Alberto Nettel-Aguirre, Kay Teschke, Meghan Winters, Brent Hagel

Slide-Deck Presentation for the Canadian Association of Road Professionals Conference, June 10-13 2018, Victoria B.C.

Background

- The good
  - Bicycling improves physical and mental health, healthy body weight, and physical literacy. (Sallis et al. 2012)
- The bad
  - 60% of parents state they drive their children to school every day. (Cloutier, 2011)
- The ugly
  - 20 children die and 900 are hospitalized from bicycling annually. (CIHI, 2017 & Parachute, 2016)
  - Bicycle-specific infrastructure reduces injury risk to adults, but little research of this kind exists with children (Teschke et al. 2012)

Aims

1. Investigate the association between the built environment and bicycling injury in children using a case-crossover approach;

2. Examine and identify study design issues with case-crossover methodology, implementation, interview, and audit procedures.

Methods

- Case-Crossover Design (Teschke et al. 2012)
  - Participants act as own control
  - Random/matched control sites
  - Based on case-control design

Methods

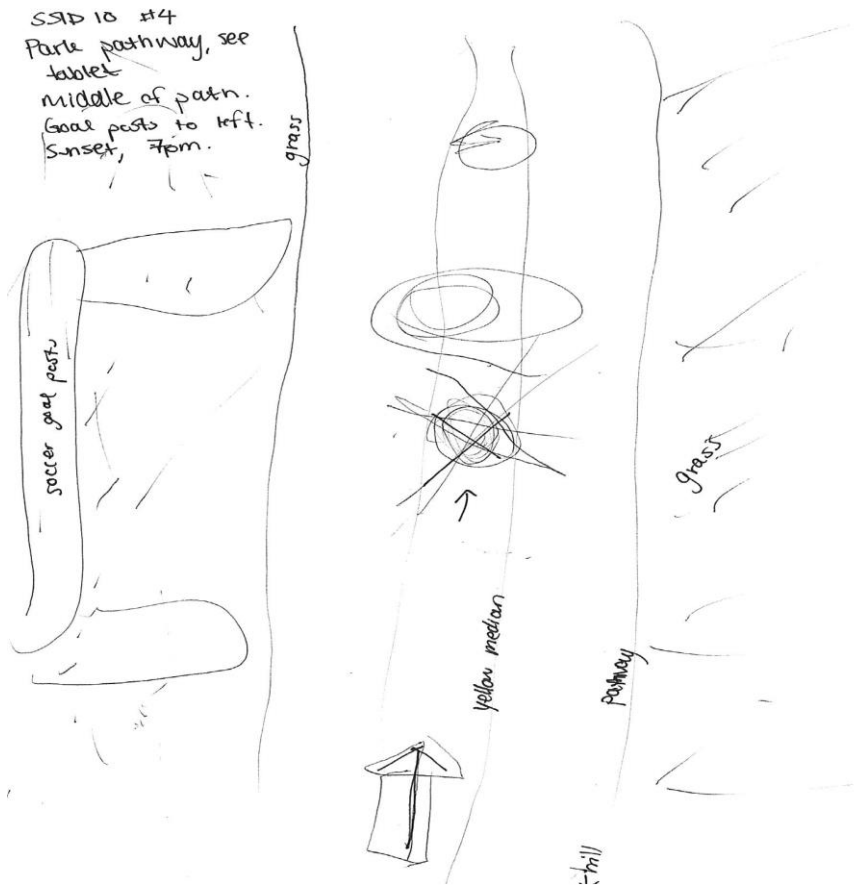
- July 11th to September 22nd 2017
- Children (<18 years old) presenting to the Alberta Children's Hospital ED with a bicycling injury
- Eligibility:
  - Who lived in Calgary & were injured on Calgary's public property
  - Were not in a bicycling event, nor trick or mountain riding
  - Were able to communicate regarding injury & bicycling route
  - Regular pedal bicycle

Methods - Recruitment

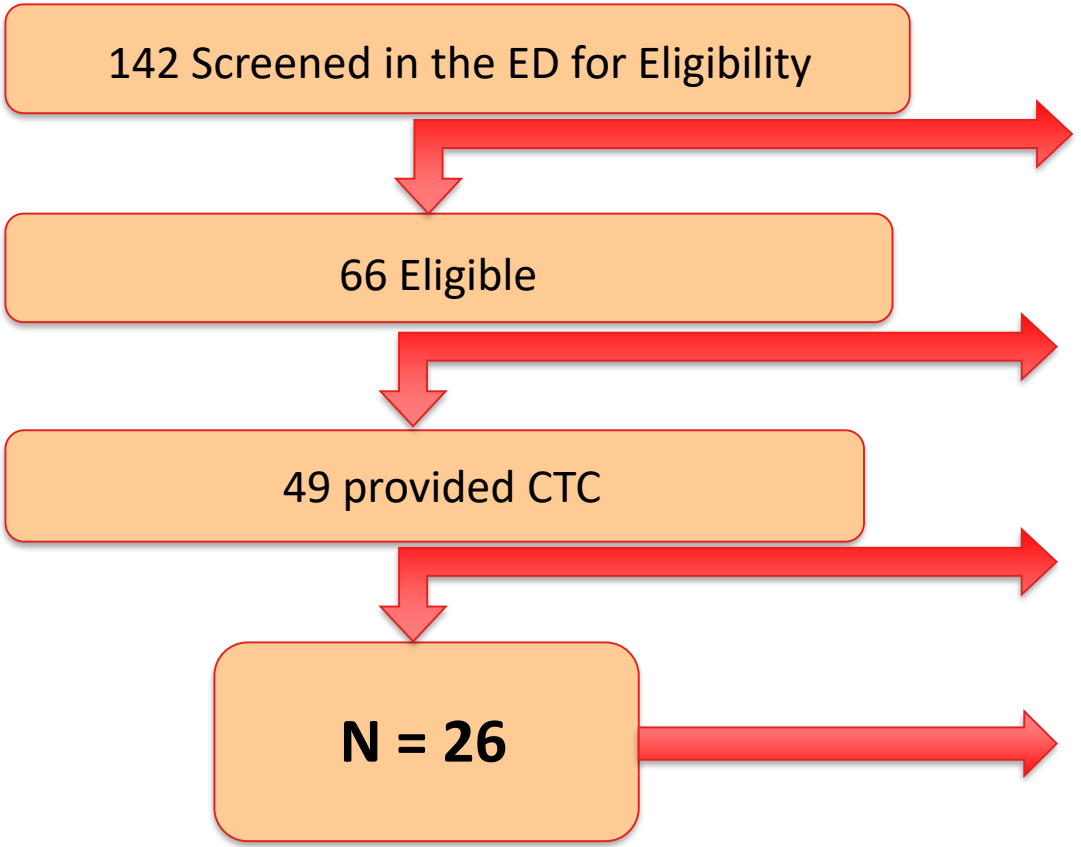
- Alberta Children's Hospital ED
- Children screened and approached by volunteer Research Assistant
- Eligible participants provided Consent to Contact
- Study team member followed up over phone to enroll

Methods

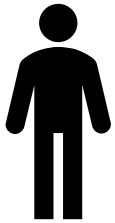
- Interview and audits



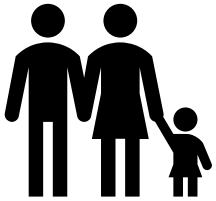
Results


142 Screened in the ED for Eligibility
76 Ineligible: 44% excluded for trick riding/mountain biking
66 Eligible
17 not interested, discharged from ED before approach, did not have parents present
49 provided CTC
23 non-response, loss to follow up, declined to participate
N = 26
39% enrollment rate of those eligible

Results



70% Male

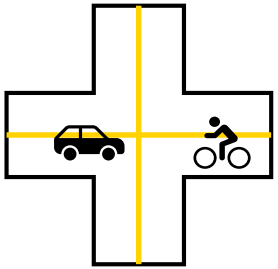


Age range 3-16
(Median: 10)

Average Distance:
479m (86-2740m)

42% Involved in
a collision

Upper extremity,
minor injuries



19% Injured at
an Intersection

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Results

	Injury Site (% cases)	Random Control (% cases)	Matched Control (% cases)
Paved Road	46.15	34.64	40
Pedestrian-Only path (Sidewalk)	19.23	30.77	28
Debris on ground	65.38	48 OR: 2.00, 95%CI 0.54-9.10	32 OR: 3.67, 95%CI 0.96-20.46
Downhill grade	61.54	42.31	50

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Results – Methodology and Study Design

- Case-crossover design
  - Controls for many confounding variables
  - Appears effective
- Recruitment
  - Low enrollment rate
  - Potential exclusion of serious injuries, working/low-income parents

Results- Methodology

- Interview/audit tools
  - Google Maps as an organizational, interview, and auditing tool
  - Child-appropriate indicators

Discussion

- Possible future trends to note for full study:
  - Increased risk associated with debris, downhill grade, and road type
  - Protective effects with uphill locations, sidewalks
- Interview directly in the ED
- Preferred contact method/times
- Trauma program
- Exclude less than 5 years old

Conclusion: Re-Visiting Study Objectives

1. Investigate the associations between the built environment and bicycling injury in children using a case-crossover approach;

2. Examine and identify study design issues with case-crossover methodology, implementation, interview, and audit procedures.

References and Acknowledgements

Funders:

Collaborators:

Research reported in this presentation was supported by the Alberta Health Services Emergency Strategic Clinical Network (ESCN). The content is solely the responsibility of the authors and does not necessarily represent the views of the ESCN Scientific Office or Alberta Health Services.

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