## Urban Traffic Calming and Health: A Literature Review

Olivier Bellefleur CDPAC, Ottawa February 8<sup>th</sup>, 2012



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### What is traffic calming?

Traffic Calming: An Equivocal Concept

Prelimbary version - for discussion

#### 1. Introduction

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#### Diverse historical perspectives and interventions

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A way of modifying the built environment which involves the installation of traffic-calming measures on the street network usually according to one of two broad approaches:

The black-spots approach The area-wide approach



### What is traffic calming?

Traffic-calming measures are designed by engineers primarily to reduce the speed and/or the volume of motorized traffic.



#### Mini-roundabout



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Speed hump



Full closure



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## What is traffic calming?

#### Black-spots approach:

Targeted interventions at high risk locations to improve safety, mostly by reducing traffic speed.



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#### Area-wide approach:

Systematic interventions on a street network to improve safety and living conditions, mostly by reducing traffic speed and volume.



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## Traffic calming and health?

#### Intervention logic:





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## What did we do?

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> URBAN TRAFFIC CALMING AND HEALTH: A LITERATURE REVIEW PRELIMINARY VERSION | NOVEMBER 2011

http://www.ncchpp.ca/175/Publications.ccnpps?id \_article=686 <u>1.</u> A systematic search of peerreviewed (n=19) and grey literature (n=10) for evaluative studies of urban traffic-calming interventions on four determinants of health:

- The number and severity of collisions
- Air quality
- Environmental noise
  - Active transportation



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## What did we do?

<u>2.</u> A broader search for peer reviewed (n=36) and grey literature (n=38) to identify:

- research gaps
- methodological issues
- mechanisms of action

<u>3.</u> A comparison of the black-spots and the area-wide appoaches



E.g., The relation between speed and noise



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#### **Collisions:**



Black-spots and area-wide interventions <u>substantially</u> <u>reduce the number and severity of collisions</u> for all users of the streets (drivers, cyclists, pedestrians, children, etc.).



Single-lane roundabout: -77% injury collisions (Retting et al., 2001)



399 20-mph (32-km/h) zones in London: -42% injury collisions (-49% children)



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#### Air quality:



Most interventions increase per vehicle emissions ( $CO_2$ , VOC, CO, NO<sub>X</sub>, PM), except those reducing speed variations (e.g., mini-roundabouts replacing stop signs).



Area-wide interventions can <u>reduce overall emissions</u> in an area if they reduce the volume of traffic.



Little or no effect on ambient air quality.



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#### Noise:



Most interventions <u>reduce the noise generated by cars</u> as a result of speed reduction.



Most interventions increase the noise generated by <u>heavy vehicles</u> (trucks, buses, etc.), by causing speed variations or introducing vertical deflections.



Source: www.pedbikeimages.org. Photographer: Dan Burden.

Centre de collaboration nationale sur les politiques publiques et la santé National Collaborating Centre for Healthy Public Policy Vertical deflections:





heavy vehicles

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#### Active transportation:

Traffic calming increases <u>perceived road</u> <u>safety</u> of pedestrians, parents, and drivers.

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Cyclists are concerned about horizontal deflections and narrowings that force them closer to moving vehicles.

Traffic calming has <u>uncertain effects on</u> the number of active trips.



A narrowing adapted for cyclists

Traffic calming has <u>uncertain effects on</u> physical activity.



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## Conclusion



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#### Thanks!

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