Urban Traffic Calming and Health Inequalities

Olivier Bellefleur
CDPAC, Ottawa
February 9th, 2012
What is traffic calming?

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.
What is traffic calming?

Black-spots approach:
• Targeted interventions at high risk locations to improve safety, mostly by reducing traffic speed.

Area-wide approach:
• Systematic interventions on a street network to improve safety and living conditions, mostly by reducing traffic speed and volume.
What did we do?

A literature review designed to help anticipate the effects of the two approaches to urban traffic-calming on four determinants of health:

- The number and severity of collisions
- Air quality
- Environmental noise
- Active transportation
What did we find?

**Intervention logic:**

<table>
<thead>
<tr>
<th>TRAFFIC-CALMING POLICY</th>
<th>PRINCIPAL MECHANISMS OF ACTION</th>
<th>EFFECTS ON HEALTH DETERMINANTS</th>
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<tbody>
<tr>
<td>Black-spots approach</td>
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<td>Improvement of air quality</td>
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Evidence:
- All street users
- Per vehicle emissions
- Total emission, with traffic volume reductions
- Little or no effect on air quality

Most promising intervention:
- Area wide
- Reduces speeds
- Reduces speed variations
- Reduces traffic volume
- Reduces health inequalities
Transportation and inequalities?

Inequalities between who and who?
- Socio-economic status (SES)
- Income
- Racial traits
- Place of residence
- Mode of transportation
- Age
- Gender
- …

Inequalities of what?
Distribution of the benefits and burdens of the transportation network:
- Accessibility
- Collisions, injuries, fatalities
- Air quality
- Noise
- Perceived safety (motorists, cyclists, children, etc.)
- …
E.g. Collision-related injuries by Socio-Economic Status group (SES)

Pan-Canadian and Edmonton CMA Age-Standardized Hospitalization Rates for Land Transport Accidents by Socio-Economic Status Group

Note
See detailed data tables (Appendix D) for significance testing.

Source
CPHI analysis of 2003-2004 to 2005-2006 National Trauma Registry data. Canadian Institute for Health Information.

CIHI, 2008, p.46.
E.g. Noisy or polluted neighbourhoods by income
How can traffic calming reduce inequalities?

- **Black-spots approach**: usually targets locations at high risk for collisions
  - In urban settings, most are usually in low SES neighborhood.

Promising strategy to reduce collision-related injuries (correlation to inequalities), but not evaluated.

Distribution of collision-related injuries in Montréal

Adapted from Morency, 2009, p.31.
How can traffic calming reduce inequalities?

- **Area-wide approach**: by targeting low SES neighbourhood to reduce inequalities:
  - Collision-related injuries ➔ 2 positive evaluations
  - Pollution (air & noise)
  - Perceived safety ➔ Promising, but not evaluated
E.g. 399 20-mph zones in London, U.K.

Source of data: Grundy et al., 2008, p.39.

Prevented injuries in 2006

Source of data: Grundy et al., 2008, p.40.
E.g. Two similar cities, U.K.

### Distribution of traffic-calming measures by SES zones

**City A (U.K.)**

- Child pedestrian injury rate (4-16 year olds; 0/00)

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<tr>
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<th>Most affluent</th>
<th>Next affluent</th>
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<td>1992-94</td>
<td>2</td>
<td>4</td>
<td>6</td>
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<tr>
<td>1995-97</td>
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<td>12</td>
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<td>8</td>
<td>10</td>
<td>14</td>
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Source of data: Jones et al., 2005

**City B (U.K.)**

- Child pedestrian injury rate (4-16 year olds; 0/00)

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Unintended effects on inequalities?

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- Modal transfer (to cycling, …)
- Traffic diversion (from one local street to another or from local streets to major roads)

People of low SES tend to be overrepresented near major roads

+ Burdens from transportation are already high
A simple framework:

<table>
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<tr>
<th>What are the anticipated effects of an intervention on the main determinants of health...</th>
<th>(\ldots\text{near the intervention?})</th>
<th>(\ldots\text{where some of the motorized traffic might be diverted?})</th>
</tr>
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<tr>
<td>Traffic diversion: Yes/No?</td>
<td>Traffic diversion: Yes/No?</td>
<td></td>
</tr>
<tr>
<td>Positive effects:</td>
<td>Positive effects:</td>
<td></td>
</tr>
<tr>
<td>Negative effects:</td>
<td>Negative effects:</td>
<td></td>
</tr>
<tr>
<td>Who lives, works, studies, etc.,...</td>
<td>Who benefits?</td>
<td>Who benefits?</td>
</tr>
<tr>
<td></td>
<td>Who bears the burden?</td>
<td>Who bears the burden?</td>
</tr>
<tr>
<td>Who travels by what mode (car, cycling, walking, etc.)...</td>
<td>Who benefits?</td>
<td>Who benefits?</td>
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References


Thanks!

Olivier Bellefleur
514-864-1600 x 3635
Olivier.bellefleur@inspq.qc.ca

Our documents are available in French and English online at www.ncchpp.ca