

Urban Traffic Calming and Health: A Literature Review

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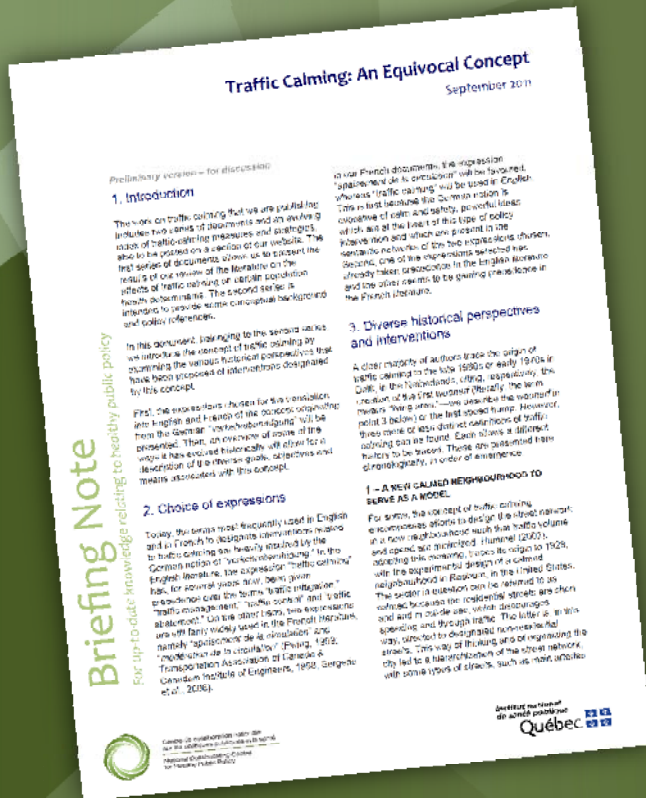
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What is traffic calming?

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



http://www.ncchpp.ca/175/Publications.ccnpps?id_article=648



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What is traffic calming?

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



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

Mini-roundabout



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

Speed hump



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

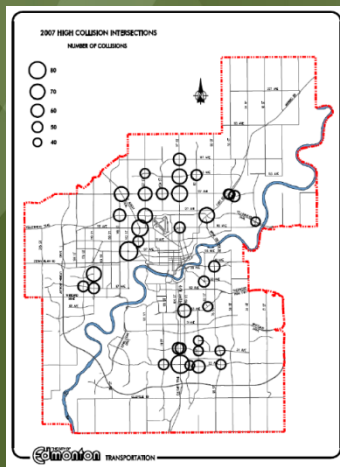
Full closure



What is traffic calming?

Black-spots approach:

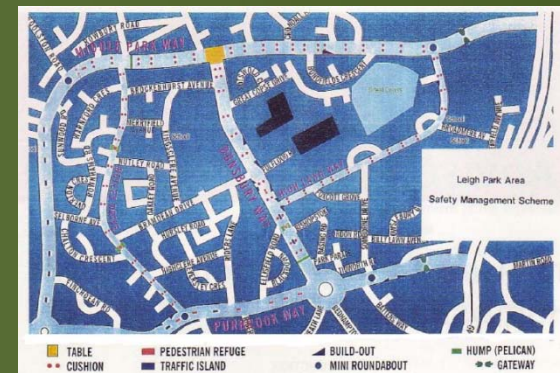
- Targeted interventions at high risk locations to improve safety, mostly by reducing traffic speed.



Source: City of Edmonton, 2008, p. 29.

Area-wide approach:

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

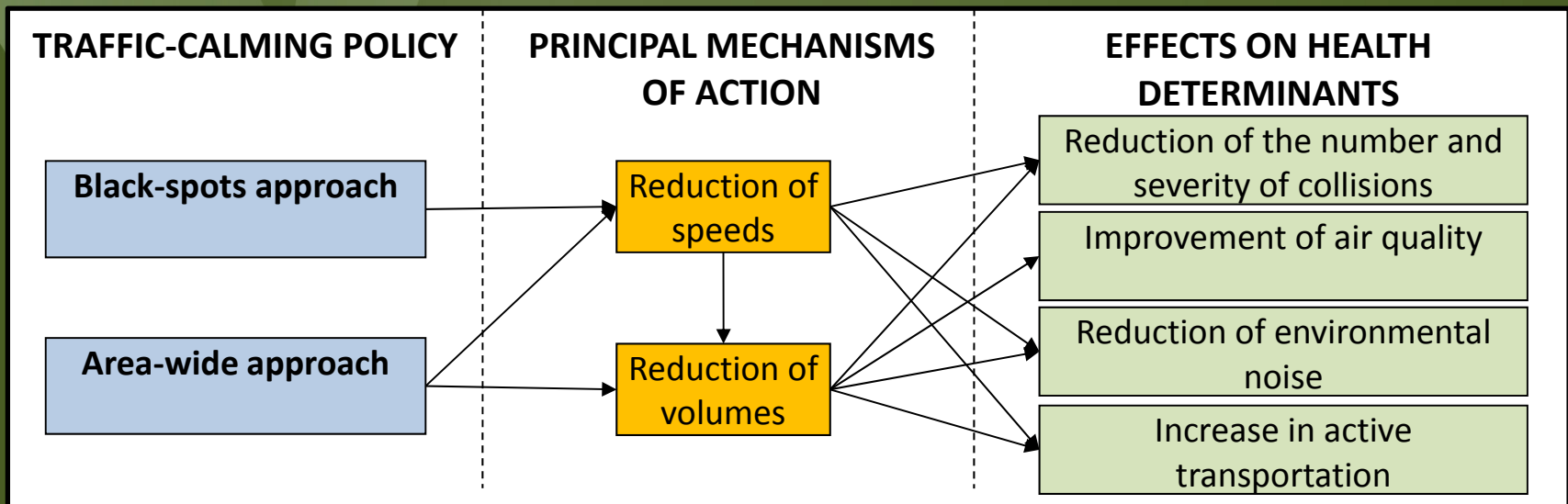


Source: Department for Transport, 1999, p.2.

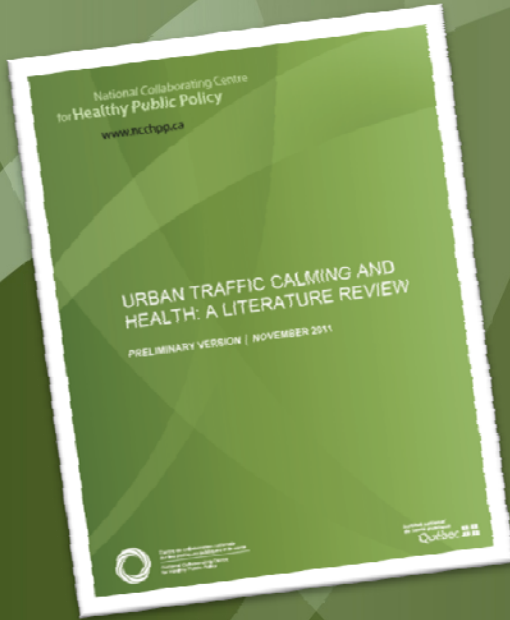


Traffic calming and health?

Intervention logic:



What did we do?



http://www.nchcpp.ca/175/Publications.ccnpps?id_article=686

1. A **systematic search** of peer-reviewed (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

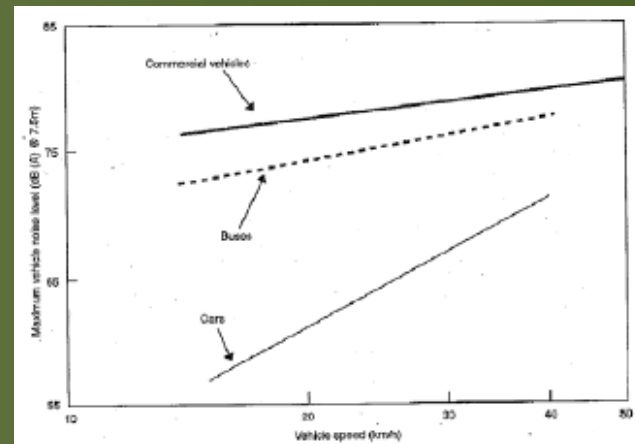


What did we do?

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

- research gaps
- methodological issues
- mechanisms of action

3. A **comparison** of the black-spots and the area-wide approaches



Source: Abbott et al., 1995, p. 9.

E.g., The relation between speed and noise



What did we find?

Collisions:



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



Source: www.flickr.com.
Photographer: WSDOT

Single-lane roundabout:
-77% injury collisions

(Retting et al., 2001)



Source: Grundy et al., 2009, p. 2.

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

(Grundy et al., 2009)



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What did we find?

Air quality:



- Most interventions increase per vehicle emissions (CO₂, VOC, CO, NO_x, PM), except those reducing speed variations (e.g., mini-roundabouts replacing stop signs).



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



- Little or no effect on ambient air quality.



What did we find?

Noise:



- Most interventions reduce the noise generated by cars as a result of speed reduction.



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



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

Vertical deflections:



- residential streets



- heavy vehicles



What did we find?

Active transportation:



- Traffic calming increases perceived road safety of pedestrians, parents, and drivers.



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



- Traffic calming has uncertain effects on the number of active trips.



- Traffic calming has uncertain effects on physical activity.



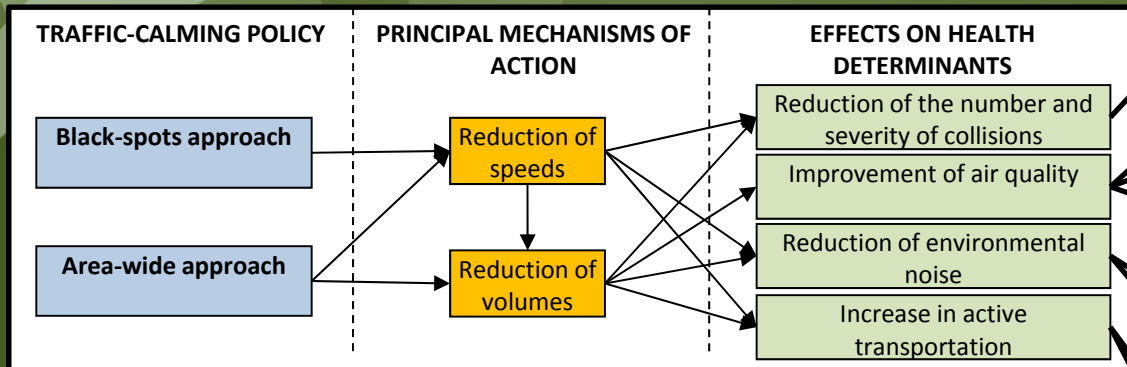
Source: www.cyclestreets.net
Photographer: unknown.

A narrowing adapted for cyclists







Conclusion



Intervention logic:





Evidence:

-  All street users

-  Per vehicle emissions
-  Total emission, with traffic volume reductions
-  Little or no effect on air quality

-  Cars
-  Trucks

-  Perceived safety (most users)
-  # of active trips and physical activity

Most promising intervention:

- Area wide
- Reduces speeds
- Reduces speed variations
- Reduces traffic volume
- Reduces health inequalities

→ Tomorrow's presentation!



References

- Abbott, P., Tyler, J., & Layfield, R. (1995). *Traffic calming: vehicle noise emissions alongside speed control cushions and road humps* (Report No. TRL 180). Crowthorne, Berkshire: Transport Research Laboratory.
- Bellefleur, O. & Gagnon, F. (2011). *Urban Traffic Calming and Health: A Literature Review*. Montréal: National Collaborating Centre for Healthy Public Policy. Retrieved from: http://www.ncchpp.ca/docs/ReviewLiteratureTrafficCalming_En.pdf
- Department for Transport. (1999). *Leigh Park Area Safety Scheme, Havant, Hampshire* (Report No. Traffic Advisory Leaflet 2/99). London: TSO. Retrieved from: <http://www.ukroads.org/webfiles/TAL%202-99%20Leigh%20Park%20Area%20Safety%20Scheme%20-%20Havant%20-%20Hampshire.pdf>
- Edmonton, the City of. (2008). *Motor Vehicle Collisions 2007*. Edmonton. Retrieved from: http://www.edmonton.ca/transportation/RoadsTraffic/2007_Annual_Collision_Report_FINAL.pdf
- Gagnon, F. & Bellefleur, O. (2011). *Traffic calming: An Equivocal Concept*. Montréal: National Collaborating Centre for Healthy Public Policy. Retrieved from: http://www.ncchpp.ca/docs/ConceptTrafficCalming_EN.pdf
- Grundy, C., Steinbach, R., Edwards, P., Green, J., Armstrong, B., & Wilkinson, P. (2009). Effect of 20 mph traffic speed zones on road injuries in London, 1986-2006: controlled interrupted time series analysis. *BMJ*, 339, b4469. doi: 10.1136/bmj.b4469
- Retting, R. A., Bhagwant, P. N., Garder, P. E., & Lord, D. (2001). Crash and Injury Reduction Following Installation of Roundabouts in the United States. *American Journal of Public Health*, 91(4), 628-631.



Thanks!

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