

As we use it, the concept of traffic calming refers to engineering measures (speed humps, curb extensions, etc.) and implementation strategies (30-km/h zones, meeting zones, etc.) that reduce speeds and/or motorized traffic volumes on existing public roadways.¹ The many intervention strategies used by public authorities can be classified into two categories. One can be designated the black-spots approach, and the other the area-wide approach. Following our definition, the strategies based on the black-spots approach are those in which measures are implemented at specific and isolated targeted spots within the road network (an intersection or on a street, for example). In strategies based on the area-wide approach, measures are deployed in an integrated manner in a zone made up of more than one street.

The purpose of this document is to provide public health authorities in Canada with a few political reference points on these two approaches so that they may better assess, if they deem this type of public action pertinent, ways of promoting traffic-calming strategies adapted to their respective contexts. This briefing note is divided into three sections. In the first, we present the similarities and differences between the two approaches in terms of principles and objectives, implementation methods and the various forms of intervention. In the second, we examine the political circumstances under which the two approaches are deployed. Lastly, in the third section, we evaluate the implications for public health authorities seeking to promote traffic-calming strategies.

Black-spots and area-wide approaches

Here we present a brief comparative description of the two approaches. This description emphasizes the premises on which they are based, the methods implemented to decide on

the intervention locations and the forms of the interventions themselves.

THE BLACK-SPOTS APPROACH

The black-spots approach is the one that predominantly guides the implementation of traffic-calming strategies in Canada. It is the result of practices driven almost exclusively by road safety management goals and objectives. In fact, traffic calming in Canada is often reduced to road design interventions and is relatively unconcerned with the broader contexts within which those roads are located. This approach is based on the idea that certain sections of isolated streets or roads have design flaws that make them particularly risky, in terms of trauma, for their users. Therefore, one of the typical efforts of the strategies inspired by this approach consists of locating the precise sites on a road network where the frequency of accidents or the risk of collision is the highest. The collisions that have occurred within a given period are often the only situations recorded (see, for example, Figure 1), although calculations may also deal with the number of collisions with injuries or the number of deaths or other data.

The black-spots approach is generally aimed at rectifying isolated design flaws on public roadways that increase the risks of collisions, injuries and death in specific locations.

This approach is ultimately aimed at reducing the number of traumas by correcting what are considered to be design flaws in these specific points in the network. When it comes to “black-spot” types of traffic-calming efforts, public authorities generally focus on interventions aimed at reducing traffic speed, even when some interventions are also put in place to divert traffic onto isolated streets or sections of streets.²

¹ For more details, see “Traffic calming: an equivocal concept” at: http://www.ncchpp.ca/175/publications.ccnpps?id_article=648.

² It should be noted that this approach drives more than just traffic-calming strategies, since it can just as well guide the adjustments to the location, direction or design of traffic lights, for example.



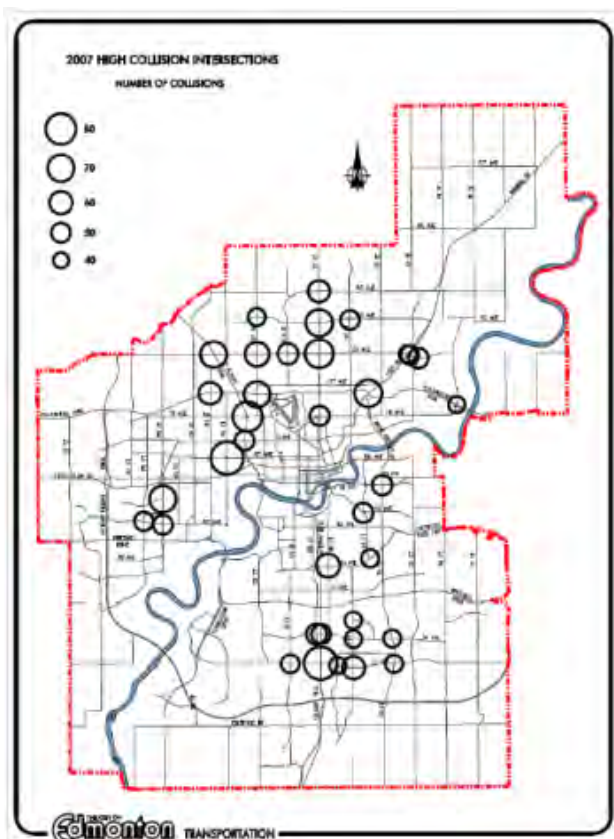


Figure 1 An example of the black-spots approach

This map results from the efforts of the City of Edmonton to locate the sites with the highest risk in its road network. Municipal authorities mapped the intersections or road sections where 40 collisions or more involving motor vehicles were recorded in 2007. The number of collisions mapped is significant (2,724), even if it only represents roughly 10% of all collisions that occurred in the city in that year.

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

THE AREA-WIDE APPROACH

The area-wide approach is generally a result of practices driven by more general goals in that it involves road safety objectives but is not limited to them. In fact, the strategies that fall under this approach are often geared towards the revitalization of an area or improvements in the quality of life or the living environment. Objectives tend to include reducing hazards associated with high speeds and high traffic volume, such as the sense of feeling unsafe, noise levels, air pollution, and so on.

The area-wide approach is usually aimed at correcting, on the system of streets in an area, systematic design biases favoring car traffic that are detrimental to other modes of transportation and functions adjacent to the streets (residences, schools, and so on).

Strategies based on the area-wide approach are founded on the notion that road networks and street design in more or less extensive areas are systematically biased in favour of motor vehicles and poorly adapted to other uses of public roadways (cycling, walking, etc.) and to the functions planned or practised in the areas where those road networks are located (residences, elementary or secondary schools, social meeting areas, etc.). The range of strategies that can be classified under this approach is vast, but some of the names that they are given are suggestive enough: 30-km/h zones (France) or 20-mph zones (United Kingdom), 40-km/h area (Canada), meeting zones (France, Switzerland), pedestrian zones or areas (France), civilized spaces (France), and so on. The surface area of the zones, the number and nature of the physical modifications made, as well as the intensity of the effort put forth to slow through traffic vary considerably from one area to the next.

Strategies based on the area-wide approach differ from those based on the black-spots approach in at least two other key ways. First, one of the objectives that drives area-wide strategies consists in reducing traffic volumes in targeted areas. In particular, the aim is to reduce through traffic, i.e., traffic using residential streets in these areas only to get to another part of the city. To achieve this objective, interventions addressing the accessibility of public roadways to through traffic are often implemented. These interventions are aimed at diverting traffic to routes deemed more appropriate, whose main purpose is specifically to carry traffic between the various areas of a city. These roadways are often designated as arterial roadways or highways. Second, when the size of the zone or the group of zones is relatively large, the objective is often to favour active and collective modes of transportation—which means that measures are often incorporated that redistribute the public road space in favour of active modes of transportation (cycle tracks, for example) or mass transit (introduction of tramways, for example).

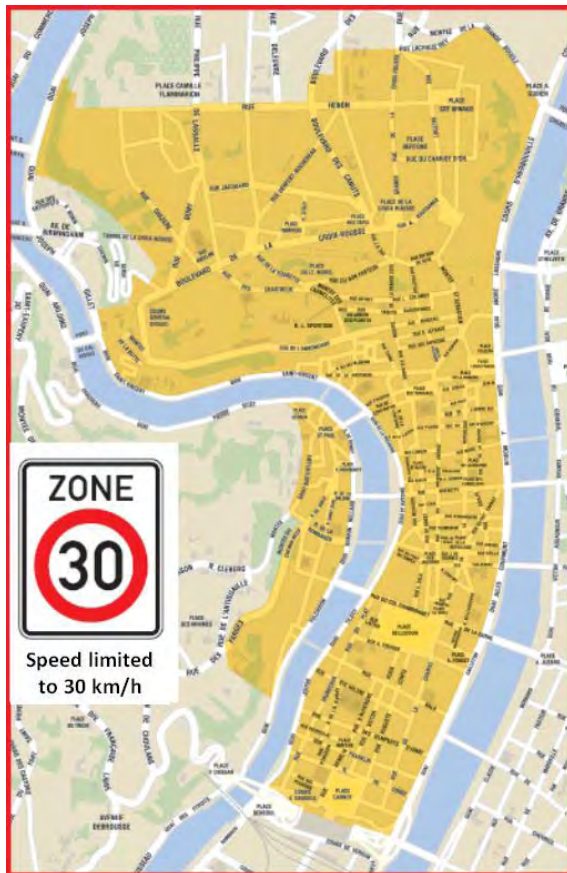


Figure 2 An example of the area-wide approach

The most extensive 30-km/h zone in France covers 87 km of residential roads in the central arrondissements of Lyon (transit routes are not involved). Traffic-calming measures were first implemented there in 2003 and are ongoing.

Source: adapted from Grand Lyon / Communauté urbaine de Lyon / France, 2007.

Apart from a few cases, such as the cities of Vancouver, North Vancouver, Toronto, Ottawa and, more recently, the borough of Plateau-Mont-Royal in Montréal, the area-wide approach as described herein still guides few strategies in the country.

Political environments

The political environments within which the two major approaches are deployed differ. They can be contrasted in two ways: 1) by examining the differences in how they define their intervention territories and the segments of the population that benefit; 2) by characterizing the political economies of the movement of goods and people to which they belong.

TRAFFIC-CALMING TERRITORIES

While not mutually exclusive, the areas defined as targets of traffic-calming interventions are not the same in the two approaches. In the black-spots approach, the intervention “territory” is determined by the methods used to locate the precise points of the network that are most “at risk” in a given jurisdiction—whether it be the administrative region of a government department, a city or a town. The work to locate the points and the ensuing intervention can therefore be done in virtually all types of environments: urban, suburban, rural, village, and so on. With regard to suburban spaces, measures are sometimes implemented on routes intended for through traffic that were designed in a way that fosters excessive speeds. In rural areas, public authorities are mainly called to intervene on the main streets in villages or towns (crosstown links). These links have often become major through roads due to growing traffic volumes and measures previously taken to increase their capacity to carry these volumes. The interventions have therefore consisted in calming the streets by reducing the lane width and planting vegetation along the sides of public roadways, for example.

While black-spot interventions are deployed in various types of environments (urban, suburban, rural, village, and so on), area-wide interventions are generally implemented in neighbourhoods experiencing large volumes of through traffic, i.e., areas in and around city centres.

In Canada and elsewhere, traffic-calming interventions based on the area-wide approach, on the other hand, target residential areas that are relatively close to large city centres. The street networks in these neighborhoods have made them accessible to large motorized traffic volumes, in particular the ever-growing through traffic between city centres and more distant areas. The arterial and highway networks developed have not managed to fully accommodate the very rapid growth of motorized traffic volumes between the areas located in and around the central areas, leading more and more motorists to use residential streets. Streets in these areas are straight and often wide, and therefore also conducive to high traffic speeds. This situation has given rise to reactions from some residents and public authorities in these areas, who see these increases in traffic volumes and high

speeds as hazardous to the quality of their living environment.

BENEFITING POPULATION SEGMENTS

Traffic-calming strategies, whether based on one approach or the other, are usually developed, at least initially, in areas where the resident population presents an above-average socioeconomic status (SES). Certain European analyses may shed some light on the phenomenon: “Populations with a high socioeconomic status are better able to formulate demands and be heard than disadvantaged social categories” (Terribilini, 1995, p.16, in Ströbele, 2009, p.11, Authors’ translation). In Montréal, for example, the first traffic-calming measures, implemented as part of black-spot strategies, were installed in the districts of Westmount and Outremont, two very affluent neighbourhoods.



Figure 3 The treatment of a school zone in the district of Villeray, in Montréal

The street comprises two or three lanes (depending on parking restrictions) and a 50-km/h speed limit.

Source: NCCHPP. Photographer: François Gagnon.



Figure 4 The treatment of a school zone in the district of Outremont, in Montréal

The street previously comprised three wide lanes. A few years ago, it was reduced to one lane through the addition of curb extensions. The speed limit is 30 km/h.

Source: NCCHPP. Photographer: François Gagnon.

These examples do not mean that traffic calming is always exclusively reserved for affluent neighbourhoods. In fact, area-wide strategies are often developed in neighbourhoods undergoing revitalization, i.e., areas where improvements are sought for the living environment to encourage or complement the influx of persons of higher SES than those currently there. Also in Montréal, a traffic-calming strategy has been put in place in the borough of Plateau-Mont-Royal. This area is definitely undergoing a socio-economic transformation and presents better SES indicators than other central neighbourhoods of the city, but it remains less affluent than Outremont and Westmount. Similarly, in London, U.K., after first being implemented in fairly affluent neighbourhoods when deployment began in 1987, area-wide strategies have, since 1991, been increasingly targeting areas with less affluent resident populations—such that those that have not yet been calmed today are areas presenting above-average SES indicators (Grundy et al., 2009; Grundy, Steinbach, Edwards, Wilkinson, & Green, 2008). Finally, in Vancouver, even the Downtown Eastside district, one of the lowest-income neighbourhoods in Canada, underwent an area-wide intervention (see Strathcona district as indicated on Figure 5) as part of a revitalization effort.

Even if they are often first deployed in areas with a population that has an above-average socioeconomic status, it is possible to develop traffic-calming strategies in response to health inequalities in a given region, as many examples demonstrate.

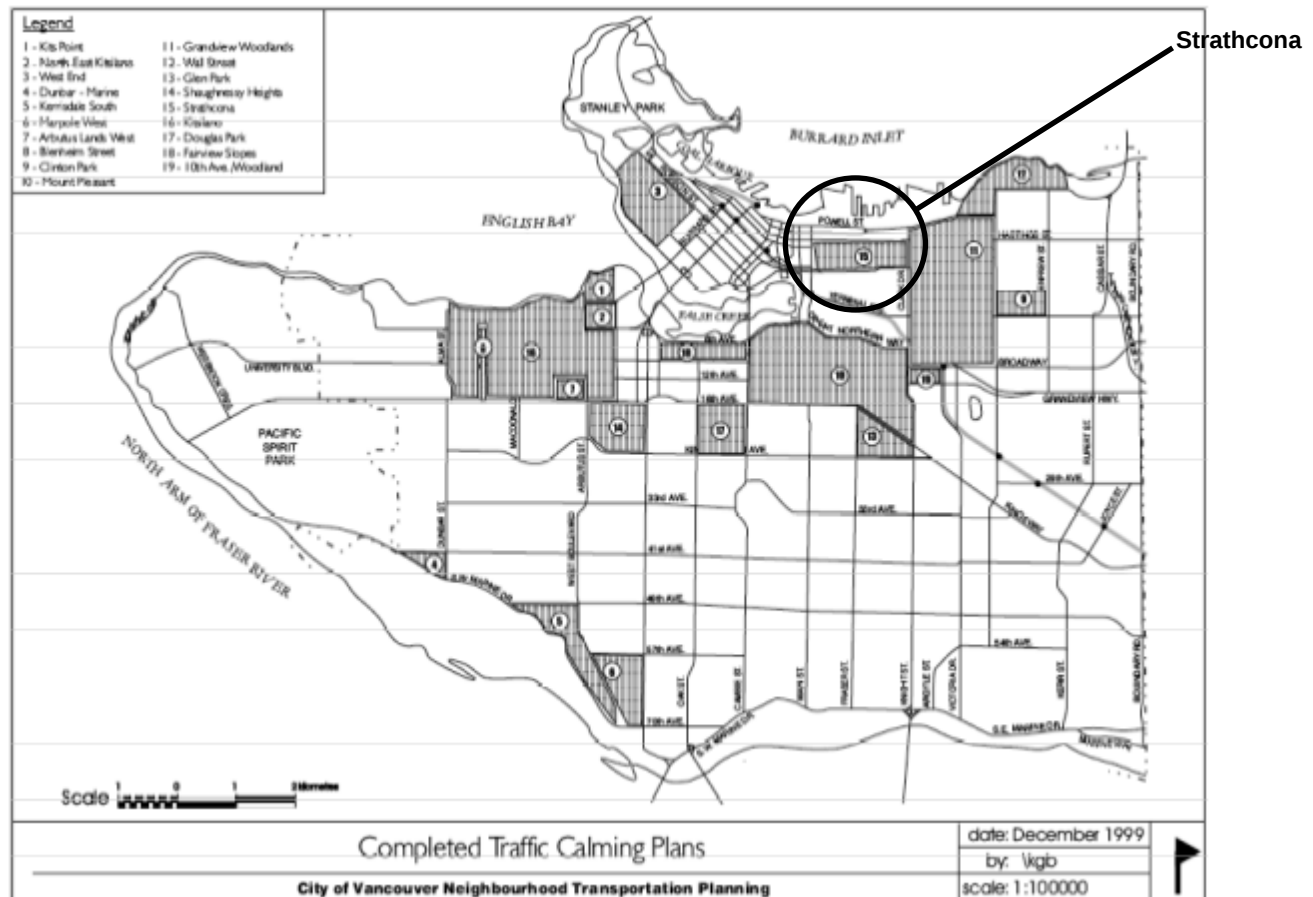


Figure 5 An area-wide strategy for a disadvantaged neighbourhood

This map of the Downtown Eastside of Vancouver shows that the traffic-calming efforts begun in 1997 had already been completed by 1999 in some highly disadvantaged neighbourhoods in terms of SES.

Source: City of Vancouver, 1999.

SYSTEMS FOR MANAGING THE MOVEMENT OF GOODS AND PEOPLE

The black-spots and area-wide approaches differ in another way: the systems for managing the movement of goods and people in which they

participate—in other words, the usual way of organizing or arranging this movement in a given territory.

Table 1 An example of a system accompanying the increase of the volumes of car traffic**Expected results (MRH)¹**

	Current situation 1993 ²	Forecasted situation 2016 ³	Desired situation in 2016	
			Objectives	Variation from expected situation
Total trips (mass transit and cars)	1,310,554	1,542,680	1,542,680	0%
Car trips (single person)	774,119	1,053,251	1,000,588	- 5%
Carpooling trips	190,929	178,742	195,022	+ 9%
Mass transit trips	345,505	310,601	347,074	+ 12%
Number of vehicle-kilometres	12,027,684	18,363,764	17,445,576	- 5%
Number of companies with more than 50 employees with an employer program	0	N/A	5,000	N/A

¹ MRH: morning rush hour.² Ministère des Transports and STCUM, 1993 origin and destination survey for the Montréal region.³ Ministère des Transports, 1993–2016 trip forecast for the Montréal region.

This table indicates the upward trends forecasted for car traffic volumes in the Montréal region and the objectives to attenuate those trends.

Source: adapted from Ministère des Transports du Québec, 2000, p.78.

In the black-spots approach, the general objective driving the system in question is to support the increase in car traffic volumes, that is, the number of cars in circulation or the number of kilometres that these cars travel as a whole. In other words, in this political economy, it is considered normal and acceptable for motorized traffic to increase—with the occasional desire to reduce it in relation to forecasted upward trends (see Table 1 summarizing the objectives of the Ministère des Transports du Québec [Québec's Ministry of Transport] for the Montréal region).

In other words, the black-spots approach is compatible with and supports a political willingness to “respect” the upward trend in traffic volumes in absolute numbers. The tendency of public authorities, in this case, is to increase the road network's capacity to carry increasingly greater motorized traffic volumes over greater distances to ensure a certain flow for this type of traffic. Specifically, the strategy refers to the “optimization” of the highway infrastructure network and arterial network capacities or improvement to their levels of service. This can be done by adding a few lanes to an existing infrastructure, eliminating street parking spaces, limiting the number of entrances and exits on and off a boulevard, increasing the permitted speed limits, implementing synchronized or “smart”

traffic lights, increasing the number of parking lots in downtown areas, and so on.

This tendency does not mean that, within these political regimes, no efforts will be made to develop mass transit services or infrastructure for active modes of transport. But decisions concerning the relevance of developing them will systematically be made in such a way as to ensure that the network's capacity to provide a sufficient level of service (or flow) for the forecasted upward trends in volumes and distances is not reduced. Therefore, a section of subway will be added to “relieve congestion” on a section of a major highway while road network development continues. A cycle track will be built on a given artery as long as it does not affect the flow on that road (several arteries have large capacity reserves and the removal of one lane for a cycle track will not change their “level of service”). In this case, traffic calming is meant as a way to mitigate the negative effects or impacts of increased motorized traffic.

Area-wide strategies can often be distinguished from black-spot strategies according to the municipal action regime with which they are associated. In fact, some of the more extensive and systematic strategies are paired with municipal actions aimed at an absolute reduction of car traffic volumes (and,

more rarely, truck traffic as well).³ In London, U.K., for example, the introduction of traffic-calming measures in nearly 400 areas of the city was accompanied by the development and implementation of an intervention known as a “congestion charge” in 2003. One of the explicit objectives of this intervention was to reduce in absolute terms the number of vehicle-km travelled in the central part of the city. The same scenario exists in the city of Vancouver, where, as is shown in Figure 6, a reduction has been achieved in both the number of vehicles and the kilometres travelled in absolute terms.

In other words, in these cases, municipal authorities implement interventions aimed at reducing “at source” the volumes of motorized vehicles travelling on their road network or on a major part of it, or the number of kilometres travelled by cars. To use the accepted terms of the practice, “demand management” interventions are implemented. Therefore, to continue with the London example, the charge for car traffic in the central districts was implemented at the same time as major improvements were made to public transit services and active transport infrastructures. In Vancouver, the development of area-wide schemes was and is accompanied by efforts to redistribute the space designated for cars in favour of active and mass transportation, gradually restrict the absolute number of parking spaces for cars, and so on, in order to respond to the demand of motorized traffic.

Black-spot interventions are generally part of political regimes aimed at supporting the increase in vehicle-kilometres travelled while mitigating its impacts. In contrast, area-wide interventions are often part of policies aimed at reducing in absolute terms the number of vehicle-kilometres travelled on a given road network.

³ The city of Montréal seems to be an exception in this regard. Montréal is a municipal structure in which two levels of governance coexist, the central city and the boroughs, which each have responsibilities in terms of car traffic—boroughs are responsible for residential and collector streets while the central city is responsible for the arterial network. In this case, the Plateau-Mont-Royal borough's strategy is aimed at reducing traffic volumes on residential streets in its territory at the same time that the central city continues its policy of increasing the capacity of its road network to support the growing number of car trips.

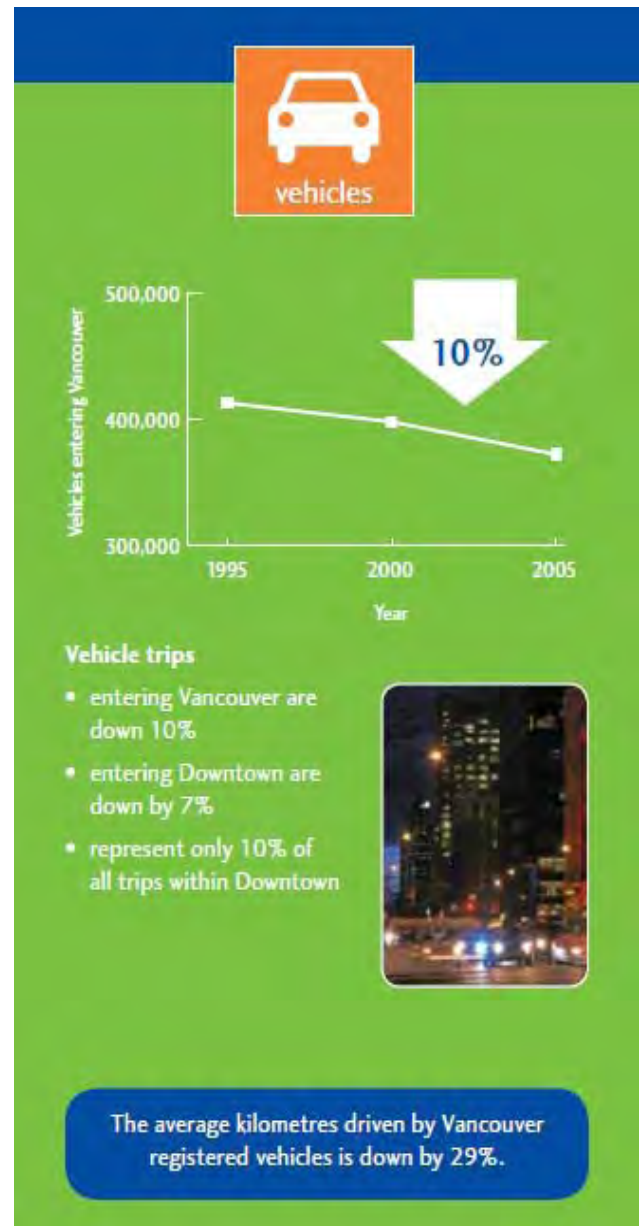


Figure 6 An example of a system aiming at reducing car traffic volumes in absolute terms

This figure indicates the results of the efforts to reduce car traffic volumes in absolute terms in the downtown of Vancouver. Area-wide calming strategies are part of those efforts.

Source: City of Vancouver, 2007.

Implications for public health actors

In examining evaluations of the health effects of strategies based on the area-wide approach and those based on the black-spots approach, we were able to distinguish the effects of each on four determinants of health (Bellefleur & Gagnon, 2011). There are still several dimensions of the evaluative literature that require further examination. For example, the literature does not allow us to determine the precise quantity of calming measures per kilometre of the road network at which a strategy based on the area-wide approach becomes efficient or to detect one or more thresholds at which synergistic effects would be felt. Nonetheless, like others, we believe that it is preferable for public health actors to promote widespread interventions mobilizing several measures, rather than promoting black-spot interventions (Morency & Cloutier, 2006). It is quite plausible that the strategies based on the area-wide approach are more likely to produce more significant effects on population health states than limited, scattered and isolated measures.

In other words, it is likely that by acting systematically on both the volumes and the speeds of motorized traffic, area-wide strategies present a greater action potential on a greater number of health determinants than black-spot strategies. They therefore offer an attractive action potential not only for the prevention of trauma, but also for the reduction of polluting emissions (atmospheric, sound) and the promotion of physical activity through the increase in active transportation. This is not to say that speed reduction in certain sections of roads cannot partially improve the active transport travel conditions, for example. Nevertheless, in this regard, black-spot strategies maintain the status quo on most of the road network even though travel in active transport does not only occur at the black spots but across the entire network, with the exception of expressways.

Lastly, particularly relevant in urban areas, and specifically in urban neighbourhoods whose populations generally have a below-average socioeconomic status for their region, area-wide strategies provide a solution for large segments of the country's and each province's population and a potential way to mitigate growing health inequalities. But this preference must *a priori* be adapted by public health actors, taking into account pragmatic as well as political considerations.

In terms of pragmatic considerations, and in keeping with the end of the previous paragraph, it is clear that such relatively extensive area-wide schemes aimed at impacting traffic volumes are not relevant everywhere. In rural areas, for example, it is perhaps the main roads crossing through villages that cause the most health problems due to the number of collisions and the noise generated, among other things. In these cases, a specific intervention aimed at reducing speeds through lane width reduction or the introduction of various measures on the road or street in question is more appropriate than an area-wide approach. In fact, the results of this type of intervention as part of an evaluation program developed in France turned out to be very interesting (Centre d'études sur les Réseaux, les Transports, l'Urbanisme et les constructions publiques, 1994).

We must also be conscious of the fact that the adoption of area-wide strategies requires fairly significant normative transformations within existing policies and practices. The very idea that a speed limit of 50 km/h is too high for a residential area is hard to sell to many road network managers, for example, as is the idea of making explicit efforts to impede the free flow of motorized traffic in certain sections of the network. Maybe in these cases the promotion of selected interventions on sections of street presenting particular circumstances (a playground, a daycare centre, a seniors' centre) and where residents request them is a path to consider. This could even be a first step towards de-normalizing the laissez-faire attitude with regard to large volumes of traffic travelling through residential areas as well as the standard 50 km/h in effect in residential areas—two prerequisites to gaining acceptance for the development of area-wide strategies.

Bibliography

- 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.
- Centre d'études sur les Réseaux, les Transports, l'Urbanisme et les constructions publiques. (1994). *Ville plus sûre, quartiers sans accidents : réalisations, évaluations*. Paris.
- Edmonton, City of. (2008). *Motor Vehicle Collisions 2007*. Edmonton. Retrieved from: http://www.edmonton.ca/transportation/RoadsTraffic/2007_Annual_Collision_Report_Final.pdf.
- Grand Lyon, Communauté urbaine de. (2007). *Zone 30*. France. Retrieved from: http://www.grandlyon.com/fileadmin/user_upload/Pdf/activites/deplacements/20070308_gl_perimetre_zone30_lyoncentre.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.
- Grundy, C., Steinbach, R., Edwards, P., Wilkinson, P., & Green, J. (2008). *The Effect of 20 mph zones on Inequalities in Road Casualties in London: A report to the London Road Safety Unit*. London: London School of Hygiene and Tropical Medicine. Retrieved from: <http://www.tfl.gov.uk/assets/downloads/the-effect-of-20-mph-zones-on-inequalities-in-road-casualties-in-london.pdf>.
- Ministère des Transports du Québec. (2000). *Plan de gestion des déplacements. Région métropolitaine de Montréal. Pour une décongestion durable*. Québec : gouvernement du Québec. Retrieved from: <http://www.mtq.gouv.qc.ca/portal/page/portal/1439A1A071442245E04400144F0104BD>.
- Morency, P. & Cloutier, M. S. (2006). From targeted “black spots” to area-wide pedestrian safety. *Injury Prevention*, 12(6), 360-364. doi: 10.1136/ip.2006.013326.
- Ströbele, M. F. (2009). *The Democratic Legitimacy of Urban Planning Procedures: Public Private Partnerships in Turin and Zurich*. Zurich: Center for Comparative and International Studies (CIS). CIS Working Paper No. 45.
- Terribilini, S. (1995). *De la distributivité des politiques régulatrices. Discriminations sociospatiales en matière de modération du trafic. Constat et causes. Illustration à l'aide des villes de Fribourg, Bienne, Neuchâtel et Saint-Gall ainsi que des communes de l'agglomération lausannoise*. Chavannes-près-de-Rennes: Cahier de l'IDHEAP, no 151. Institut des hautes études en administration publique.
- Vancouver, City of. (1999). *Completed Traffic Calming Plans*. Vancouver. Retrieved from: <http://vancouver.ca/engsvcs/transport/calming/documents/calmingw.pdf>.
- Vancouver, City of. (2007). *Transportation Plan Update: A Decade of Progress*. Vancouver. Retrieved from: <http://vancouver.ca/engsvcs/transport/plan/pdf/trans-plan-brochure.pdf>.

October 2011

Authors: François Gagnon and Olivier Bellefleur, National Collaborating Centre for Healthy Public Policy

ACKNOWLEDGMENTS

We would like to thank Annie Rochette from the Montréal Urban Ecology Centre for her comments and suggestions on a preliminary draft of this document.

The National Collaborating Centre for Healthy Public Policy (NCCHPP) seeks to increase the expertise of public health actors across Canada in healthy public policy through the development, sharing and use of knowledge. The NCCHPP is one of six centres financed by the Public Health Agency of Canada. The six centres form a network across Canada, each hosted by a different institution and each focusing on a specific topic linked to public health. In addition to the Centres' individual contributions, the network of Collaborating Centres provides focal points for the exchange and common production of knowledge relating to these topics. The National Collaborating Centre for Healthy Public Policy is hosted by the Institut national de santé publique du Québec (INSPQ), a leading centre in public health in Canada.

Production of this document has been made possible through a financial contribution from the Public Health Agency of Canada through funding for the National Collaborating Centre for Healthy Public Policy (NCCHPP). The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.

All Images in this document have been reproduced with permission or in accordance with licences authorizing their reproduction. Should you discover any errors or omissions, please advise us at ncchpp@inspq.qc.ca.

Publication N°: 1396

This document is available in its entirety in electronic format (PDF) on the Institut national de santé publique du Québec website at: www.inspq.qc.ca and on the National Collaborating Centre for Healthy Public Policy website at: www.ncchpp.ca.

La version française est disponible sur le site Web du Centre de collaboration nationale sur les politiques publiques et la santé CCNPPS) au : www.ccnpps.ca.

Reproductions for private study or research purposes are authorized by virtue of Article 29 of the Copyright Act. Any other use must be authorized by the Government of Québec, which holds the exclusive intellectual property rights for this document. Authorization may be obtained by submitting a request to the central clearing house of the Service de la gestion des droits d'auteur of Les Publications du Québec, using the online form at <http://www.droitauteur.gouv.qc.ca/en/autorisation.php> or by sending an e-mail to droit.auteur@cspq.gouv.qc.ca.

Information contained in the document may be cited provided that the source is mentioned.

LEGAL DEPOSIT – 1st QUARTER 2012
BIBLIOTHÈQUE ET ARCHIVES NATIONALES DU QUÉBEC
LIBRARY AND ARCHIVES CANADA
ISBN: 978-2-550-64021-9 (FRENCH PRINTED VERSION)
ISBN: 978-2-550-64022-6 (FRENCH PDF)
ISBN: 978-2-550-64023-3 (PRINTED VERSION)
ISBN: 978-2-550-64024-0 (PDF)

© Gouvernement du Québec (2012)



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

Institut national
de santé publique

Québec

