Motorized Traffic and Health: Interventions to Mitigate its Impacts

Highways through urban areas

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Presentation outline

1. Highways through urban areas
2. Health impacts. Road safety.
3. Intervention strategies
4. Quebec's approach
5. Design techniques
   - Health impacts
   - Examples of design in Quebec
6. European examples
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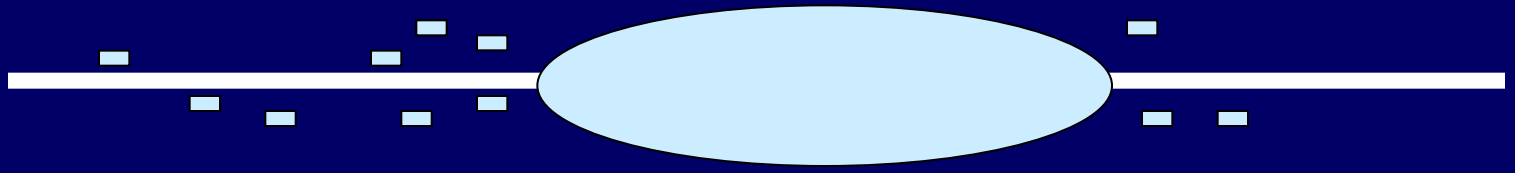
Highways through urban areas

- *Residential streets*
- *Commercial streets*
- *Urban boulevards*
- Highways through urban areas
  - Roads managed by the Department of Transport
  - National, regional and collector

- Road
  - Through traffic
  - Heavy vehicles
- Main arterial road of the municipality
  - Urban activities
  - Pedestrians, cyclists, residents, walkers…
  - Parking



Health impacts

Health issues

- Air pollution
- Noise
- Choice of travel mode
- Feeling of insecurity
- Risk of road crashes

Main factors

- Traffic volume
- Speed
- Design

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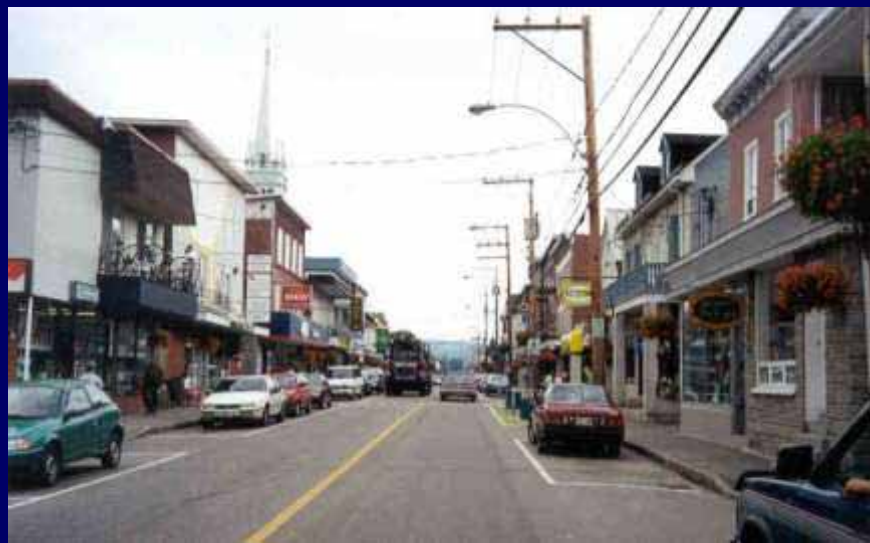


Impacts on road safety
National, regional and collector roads in Quebec

	Speed limit		
	50 km/h and 60 km/h	70 km/h	All speed limits
Injury crashes	26%	15%	100%
Fatal and serious injury crashes	17%	11%	100%
Injury crash rate	0.61	0.40	0.37

Source: Data from the Société de l'Assurance automobile du Québec (SAAQ), 2007-2009. Processing by the Quebec Department of transport.

Impacts on road safety
National, regional and collector roads in Quebec

Most collisions involving pedestrians or cyclists occur in urban areas and in transition zones and in rural-urban transition zones

	Speed limit		
Proportion of collisions with pedestrians and cyclists	50 km/h and 60 km/h	70 km/h	All speed limits
Serious injury or death	24%	15%	9%
Injuries	12%	7%	6%

Source: Data from the SAAQ, 2007- 2009. Processing by the Quebec Department of transport.

Road safety and speed

- One of the most important contributing factors to vehicle crashes: speed
- In Quebec, speed-related crashes account for:
  - ✓ 42% of deaths (225 deaths per year)
  - ✓ 36% of serious injuries (840 per year)
  - ✓ 24% of minor injuries (9,900 per year)

Source : SAAQ Web site (data 2007-2011)

- Increasing speed raises the risk of collision and the severity of injuries

  1 km/h reduction in average driving speed:
  - ➔ 2% reduction in injury crashes
  - ➔ 3% reduction in serious injury crashes
  - ➔ 4% reduction in fatal crashes

Source :Aarts, L. & van Schagen, I. (2006), Driving speed and the risk of road crashes: a review. Accident Analysis and Prevention, vol 38, issue 2)

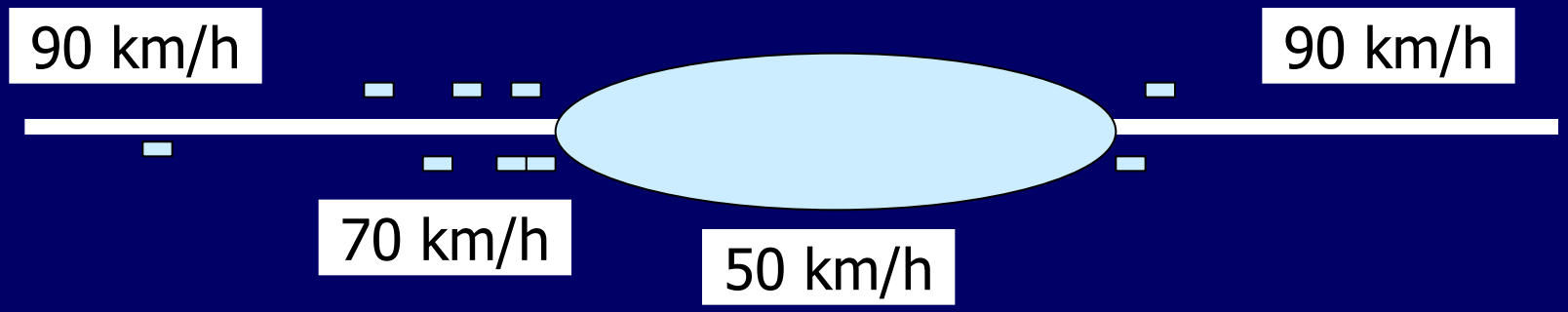
- Speed differentials increase the risk of collision

Road safety and speed

Driving speeds

- Sample of 24 through roads (speed limit of 50 km/h)
  - Average speed: 56 km/h
  - 85 percentile: 66 km/h

Source : Bellalite, L. Évaluation de l'impact du profil en travers sur les vitesses pratiquées au sein des traversées des petites agglomérations. Université de Sherbrooke, 2002



Intervention strategies

Regulation
Engineering
Education
Enforcement

Intervention strategies

- Regulation: speed limit
- Quebec Highway Safety Code
  - 90 km/h on roads surfaced with concrete or asphalt
  - 50 km/h in built-up areas – Highways through urban areas
- May be modified by road network manager
  - 70 km/h in transition zones
- Coherence of the road environment

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Intervention strategies

- Traditional interventions for highways through urban areas
  - Redesign according to motorized traffic
  - Bypass
- Costs
- New approach developed in Quebec in the 1990s

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Intervention strategies

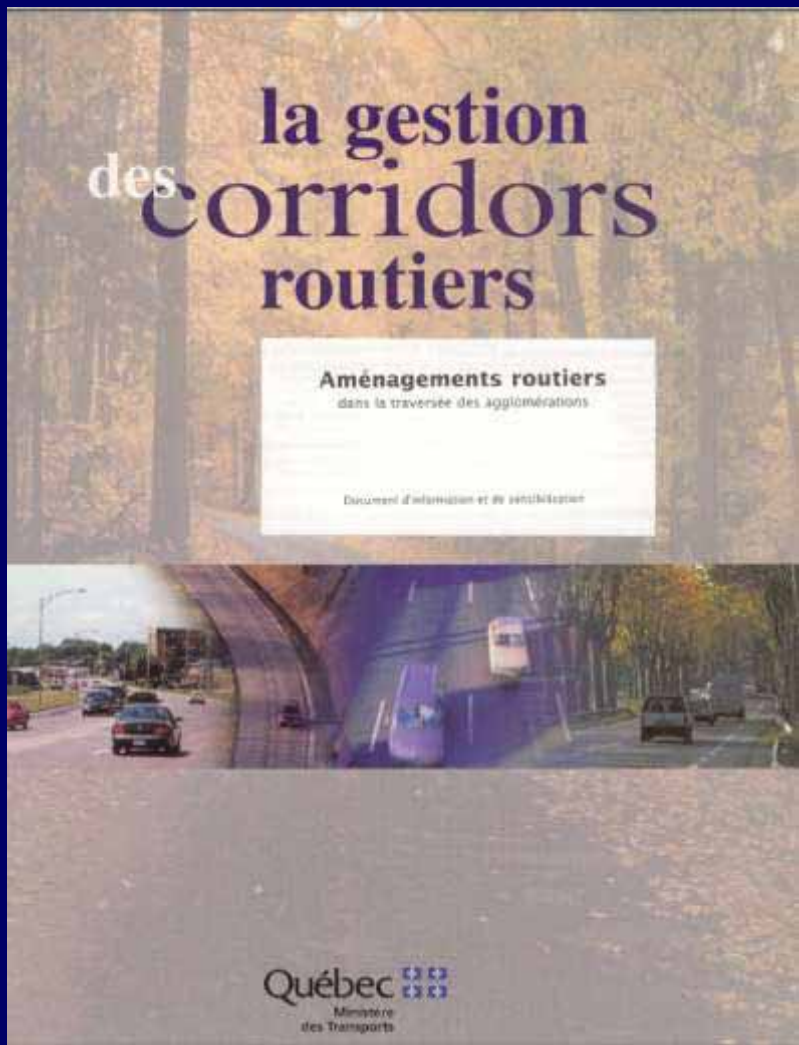
- The "Ville plus sûre, quartiers sans accidents," program in France (safer cities, accident-free neighbourhoods)
  - Innovative approach, projects designed by a multidisciplinary team
  - Positive impact on road safety, quality of life, and economic activity
  - Around forty sites redesigned during the 1980s
  - Principles still valid in the field of traffic calming and road safety in urban areas

Quebec's approach

- Publication by the Quebec Department of Transport:

  La gestion des corridors routiers. Aménagements routiers dans la traversée des agglomérations - Document d'information et de sensibilisation, 1997

  « Highway corridor management. Improving roads passing through urban areas. Information and awareness paper »



Quebec's approach

- An innovative, global approach
- Overall objective: combining the demands of motorized traffic, road safety and the urban environment (arterial revitalization)
- Results:
  - Transportation plans
  - Land use and development plans of a regional county municipality

  → Comprehensive projects
  → Spots treatment

Request from the municipality or analyses of Quebec DoT

Quebec's approach

- Principles
  - Influence the perception of drivers so they adapt their behaviour to the environment
  - Improve the way in which public space is shared between all types of users
- Approach
  - Analysis and intervention methodology that takes into account all components of the environment
  - Road design techniques
  - Cooperation of all stakeholders

Quebec's approach

- Analysis and intervention methodology
  1. Start-up

     Identification of problem. Establishment of work team and steering committee
  - Diagnosis

    Traffic, road safety, geometry, spatial organization of urban area, economic activities, etc.
  - Design

    Division in segments. Gateways. Cross-sections. Volumes and perspectives
  - Execution of works
  - Evaluation

Design techniques

- Road
- Sidewalks
- Bikeways
- Streetscaping, street furniture
- Work on buildings, off-road parking, adjacent land
- Land development regulations

- ✓ Road narrowing
- ✓ Curb extensions
- ✓ Horizontal deflections – chicanes
- ✓ Raised medians
- ✓ Roundabouts – Signals.
- ✓ Raised crosswalks
- ✓ Streetscaping - materials

- ✓ Management of urbanization perimeters
- ✓ Access and intersections management
- ✓ Installation of buildings

Design techniques

	Cooperation
• Road	• Department of transport (territorial branch)
• Sidewalks	• Municipality
• Bikeways	• Department and/or municipality (Cycling Policy)
• Streetscaping, street furniture	• Municipality
• Work on buildings, off-road parking, adjacent land	• Property owners – residents – business owners
• Land development regulations	• Municipality or regional county municipality

Health impacts

Literature review

- Reduction in the number of road crashes.
  - Reduction of 4 lanes to 3 lanes (Road Diet – urban artery): 29% reduction in all crashes
  - Conversion of an intersection with minor road Stop control to a modern roundabout (rural area): 87% reduction in injury crashes
- Speed reduction
  - One of the explanatory variables: sidewalk width
- Improvement of quality of life
- Economic and urban revitalization

Source : FHWA, Highway Safety Manual, 2010

Source : Bellalite, L. Évaluation de l'impact du profil en travers sur les vitesses pratiquées au sein des traversées des petites agglomérations. Université de Sherbrooke, 2002

Bolton Est

- 800 inhabitants
- Regional road 245
- Average annual daily traffic (AADT): 1,500 (2008)
- Work done in 1998
- Results in 1999
  - ✓ 6 km/h reduction in average driving speed
  - ✓ Increase in number of pedestrians
  - ✓ Satisfaction of residents
- Prize for road safety awarded by AQTR (Quebec's road transport association) in 1999

Saint-Irénée

- 700 inhabitants
- Regional road 362
- AADT: 1,800 (2008)
  Average Summer DT (ASDT): 3,600
- Tourism
- Steep slopes
- Project components
  - ✓ Speed limit
    30 km/h through town
  - ✓ Improved space use

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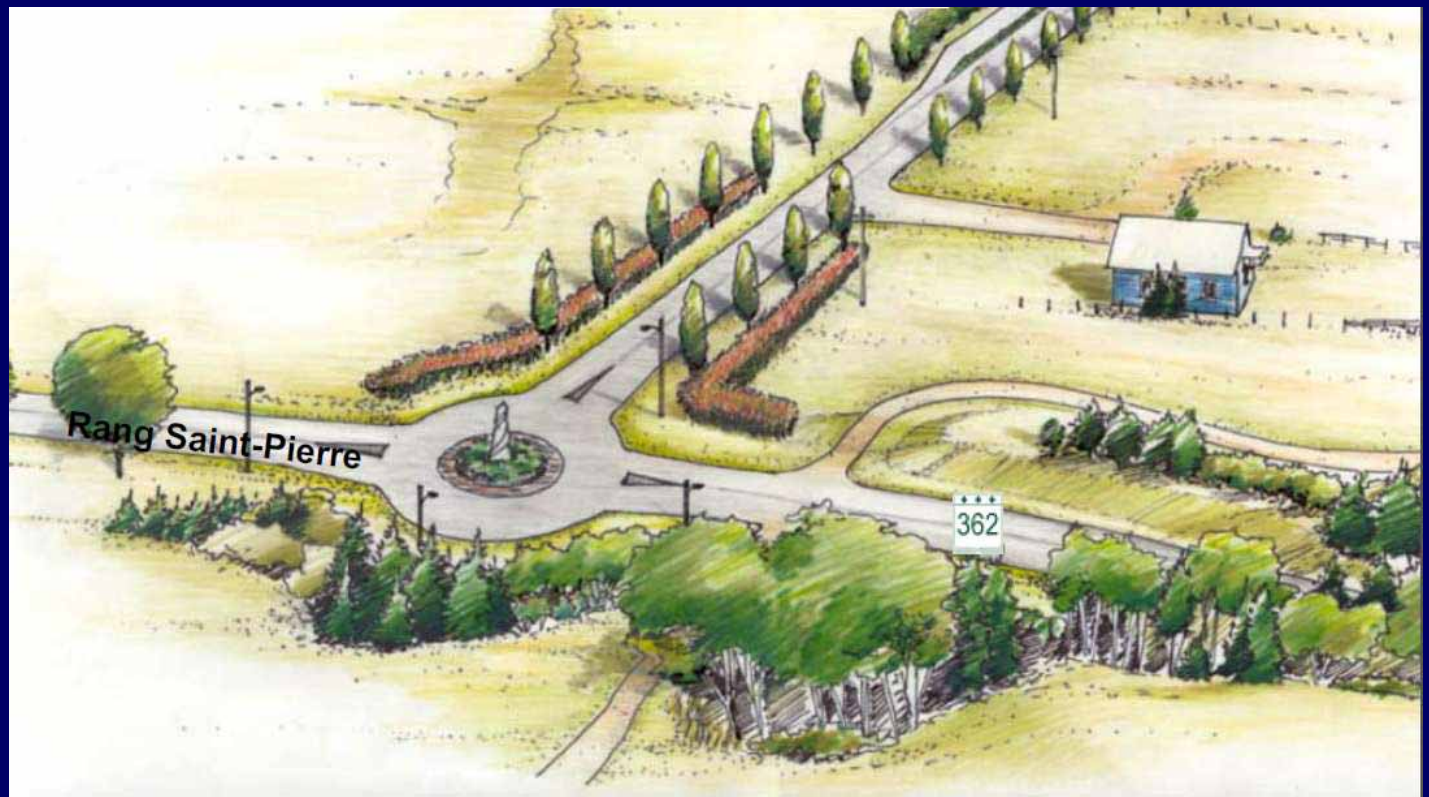
Saint-Irénée

- Roundabout at the eastern entrance
- Constructed in 2008 - 2009



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Lavaltrie

- 13,000 inhabitants
- Regional road 138
- AADT: 8,000 (2008)
- Work: 2002, 2006 and 2008 – 2009
  - ✓ Chicane at the entrance
  - ✓ Multi-purpose path (Route verte)
  - ✓ Raised crosswalks
- Results in 2009:
  - ✓ Reduction in driving speed (85 percentile)
    In 2002: 80 km/h
    In 2009: 60 km/h

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Amqui

- 6,200 inhabitants
- National road 132
- AADT: 4,000 (2008)
- Work: 1999 - 2003
  - ✓ Gateways
  - ✓ Sidewalks and crosswalks
  - ✓ Turning lanes and traffic lights at intersections
  - ✓ Road shoulders for cyclists
  - ✓ Treatment in front of commercial buildings
  - ✓ Construction of a park
  - ✓ Façade restoration program
- Prize for road safety awarded by AQTR in 2005

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Saint-Aimé-des-Lacs

- 1,200 inhabitants
- Collector road
- AADT: 2,200
- Experimental project : Speed humps installed during the summer beginning in 2008
- Results
  - ✓ Speed reduction: between 5 and 14 km/h (85 percentile)
  - ✓ Reduction in driving violations
  - ✓ Reduction in collisions during the summer
  - ✓ Perceived increase in noise

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European examples

- Hierarchization of road network in urban areas
  - Pedestrian priority zones (20 km/h)
  - 30 kmph zone
  - 50 km/h zones
- « Street use code »
- Several countries:
  - Belgium
  - France
  - Luxembourg
  - Switzerland

European examples

Switzerland

- 30 kmph Zone possible on secondary or main roads
- Koniz. Treatment of 300 m of road
  - 20,000 vehicles per day
  - No traffic lights
  - Pedestrian crosswalks eliminated
- Results
  - Fluid traffic operation
  - Delay for crossing: Less than 10 sec.
  - Increase in sales for businesses

Conclusion

- Success factors
  - Political will
  - Multidisciplinary approach
  - Cooperation
- Challenges
  - Winter conditions
  - Duration of realization
  - Costs
- Perspectives
  - Territorial sustainable mobility plans
  - Government strategy for sustainable intervention in road safety
  - Renewal of government orientations for land use planning. Urban development management.

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Documentation

- Ministère des Transports du Québec
  - *La gestion des corridors routiers. Aménagements routiers dans la traversée des agglomérations - Document d'information et de sensibilisation*, 1997
  - Fact sheets on traffic calming and examples
    - ✓ *Dos d'âne allongés et coussins*. 2011
  - *Politique sur le vélo*

  www.mtq.gouv.qc.ca – Partenaires – Municipalités – Sécurité routière

- Ministère des Affaires municipales (…)
  L'aménagement et l'écomobilité, Guide de bonnes pratiques sur la planification territoriale et le développement durable. 2011

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Documentation

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  Fiche conseil no 19 - Aménager les traversées des agglomérations en milieu de vie. 2011
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  - www.certu.fr
  - www.ville30.org

- Switzerland
  - www.ate.ch
  - www.rue-avenir.ch