Motorized Traffic and Health: Interventions to Mitigate its Impacts

Highways through urban areas

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Road safety division
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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

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

<table>
<thead>
<tr>
<th></th>
<th>Speed limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 km/h and 60 km/h</td>
</tr>
<tr>
<td>Injury crashes</td>
<td>26%</td>
</tr>
<tr>
<td>Fatal and serious injury crashes</td>
<td>17%</td>
</tr>
<tr>
<td>Injury crash rate</td>
<td>0.61</td>
</tr>
</tbody>
</table>

Source: Data from the Société de l'Assurance automobile du Québec (SAAQ), 2007-2009. Processing by the Quebec Department of transport.
Most collisions involving pedestrians or cyclists occur in urban areas and in transition zones and in rural-urban transition zones.

<table>
<thead>
<tr>
<th>Proportion of collisions with pedestrians and cyclists</th>
<th>50 km/h and 60 km/h</th>
<th>70 km/h</th>
<th>All speed limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious injury or death</td>
<td>24%</td>
<td>15%</td>
<td>9%</td>
</tr>
<tr>
<td>Injuries</td>
<td>12%</td>
<td>7%</td>
<td>6%</td>
</tr>
</tbody>
</table>

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)

• 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

• Speed differentials increase the risk of collision

Source: SAAQ Web site (data 2007-2011)

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)
Driving speeds

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

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
Intervention strategies

• Traditional interventions for highways through urban areas
  ➢ Redesign according to motorized traffic
  ➢ Bypass

• Costs

• New approach developed in Quebec in the 1990s
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

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- Land development regulations

Cooperation

- Department of transport (territorial branch)
- Municipality
- Department and/or municipality (Cycling Policy)
- Municipality
- Property owners – residents – business owners
- 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


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
Saint-Irénée

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

- 13,000 inhabitants
- Regional road 138
- AADT: 8,000 (2008)
  - 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
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
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
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
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.
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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