

A Decade of (re)discovery: Public Health and the Built Environment



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Medical Officer of Health

Disclosure of Interests

When I cycle I
feel young.

.....

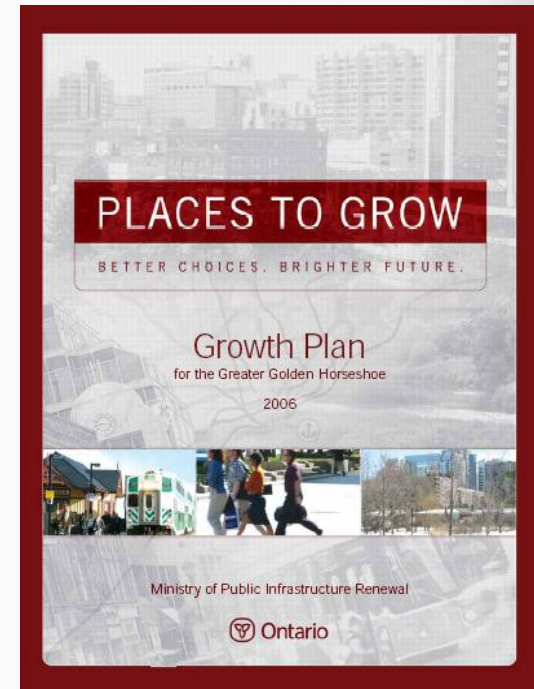
I want to be able
to cycle safely
throughout
Ontario by the
time I retire.



“Discovering” the Built Environment



- The Public Health movement and the Planning Community both began with John Snow and the Broad Street Pump
- With Places to Grow in 2006, the Public Health community reawakened to the impact of the built environment on health
- What have we been doing since? And where do we hope to go?



Public Health is....

- A 160 year old movement
- Strategies focused on populations
- To prevent disease, and protect and promote health



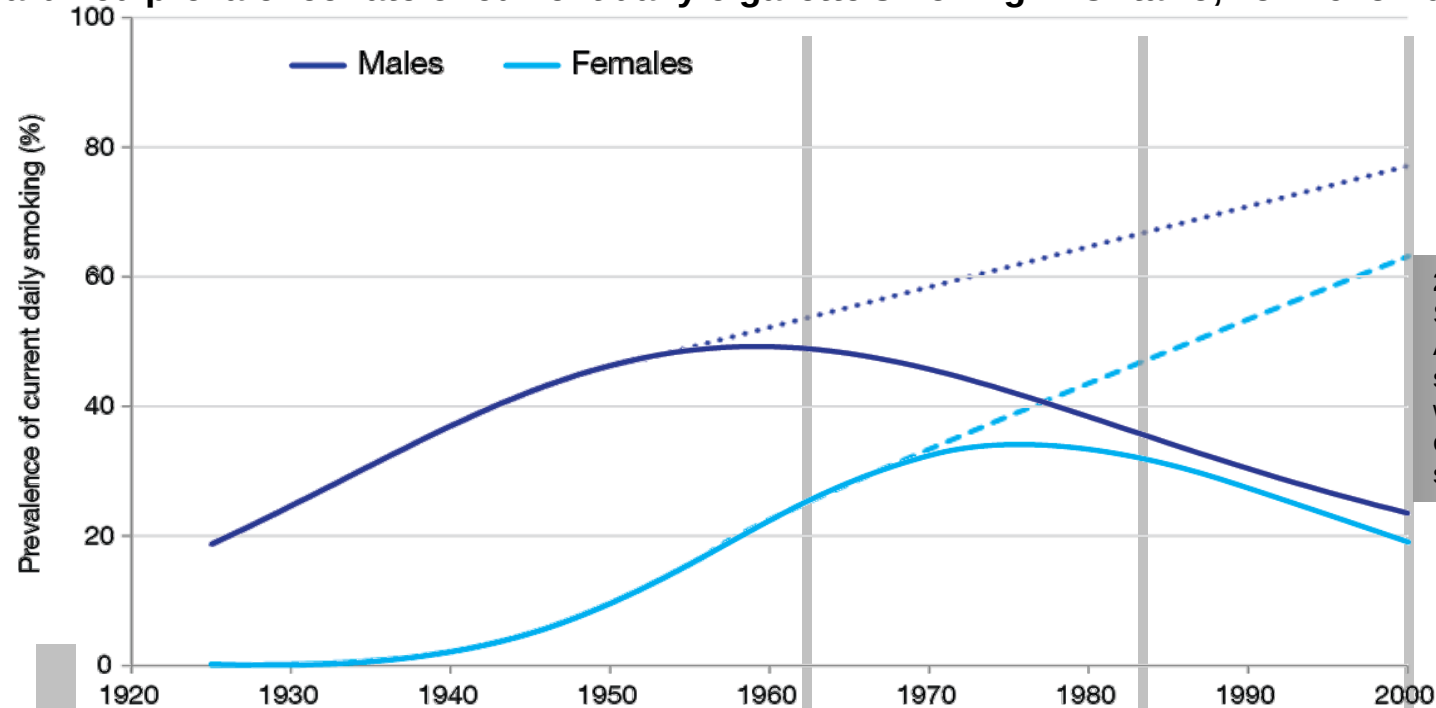
The Things That Make Us Healthy

- Environment
 - physical, social, political, economic
- Behaviour
 - smoking, diet, physical activity, injuries, sexual health
- Human Biology
 - age, gender, family history
- Health Care
 - prevention, treatment, rehabilitation



Learning to take the long view...

Age-standardized prevalence rate of current daily cigarette smoking in Ontario, 15+ 1925-2000



2006
Smoke-Free Ontario Act prohibited smoking in all workplaces and enclosed public spaces.

1914-1918

WWI: Cigarettes sent overseas to soldiers as an act of patriotism

1964

US Surgeon General Report on Smoking

1984

Major tax increases on tobacco products

2000

Series of health warnings appear on cigarette packages

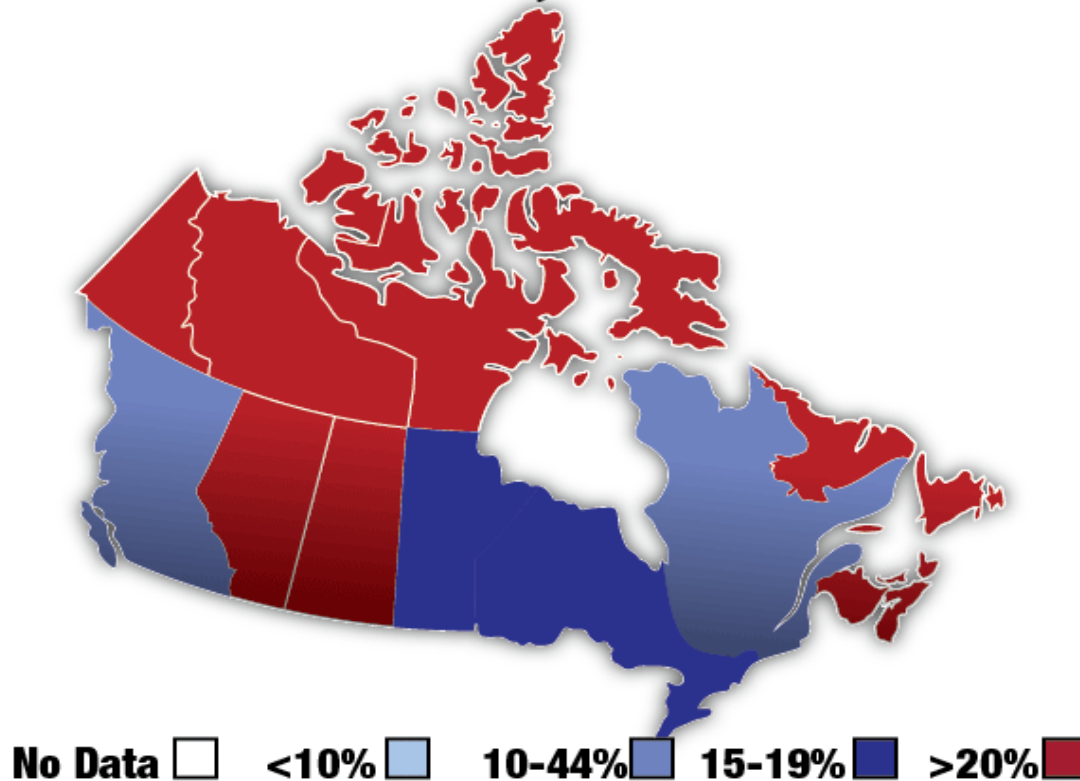
Community design is a health priority



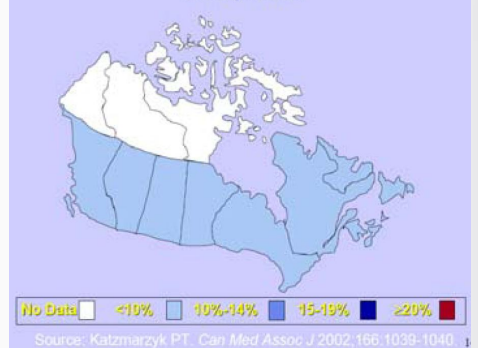
Many of our health challenges are related to how we have built our communities.

Dramatic Increase in Obesity

Obesity Trends Among Canadian Adults CCHS, 2003

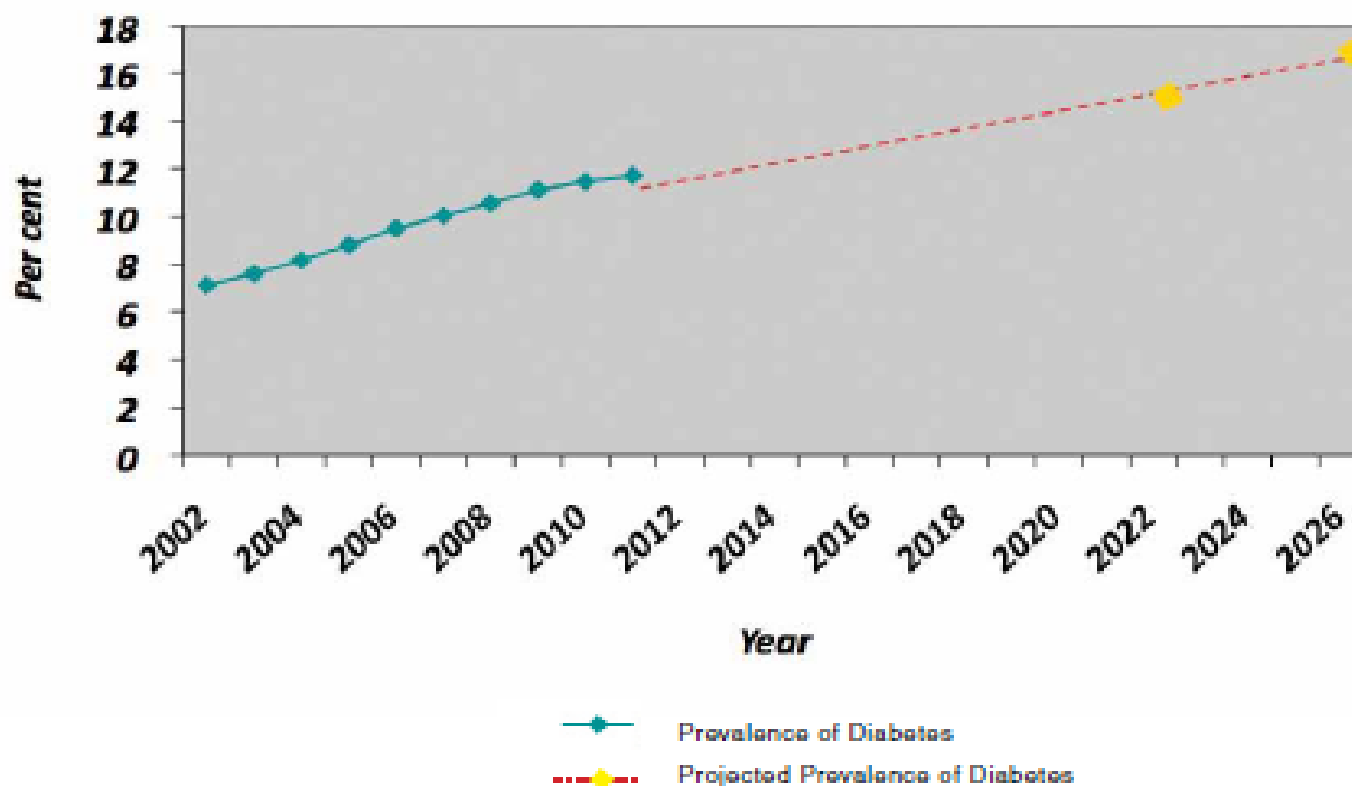


Obesity Trends Among Canadian Adults HPS, 1985



Increasing Diabetes

FIGURE 3: ACTUAL & PROJECTED PREVALENCE OF DIABETES. GTHA. 2002-2027



Physical activity reduces...

- Heart disease
- Falls and injuries
- Obesity
- High blood pressure
- Adult-onset diabetes
- Osteoporosis
- Stroke
- Depression
- Colon cancer
- Premature death





**...YET WE HAVE ENGINEERED PHYSICAL ACTIVITY
OUT OF OUR LIVES**



We Have Engineered Physical Activity Out of Our Lives



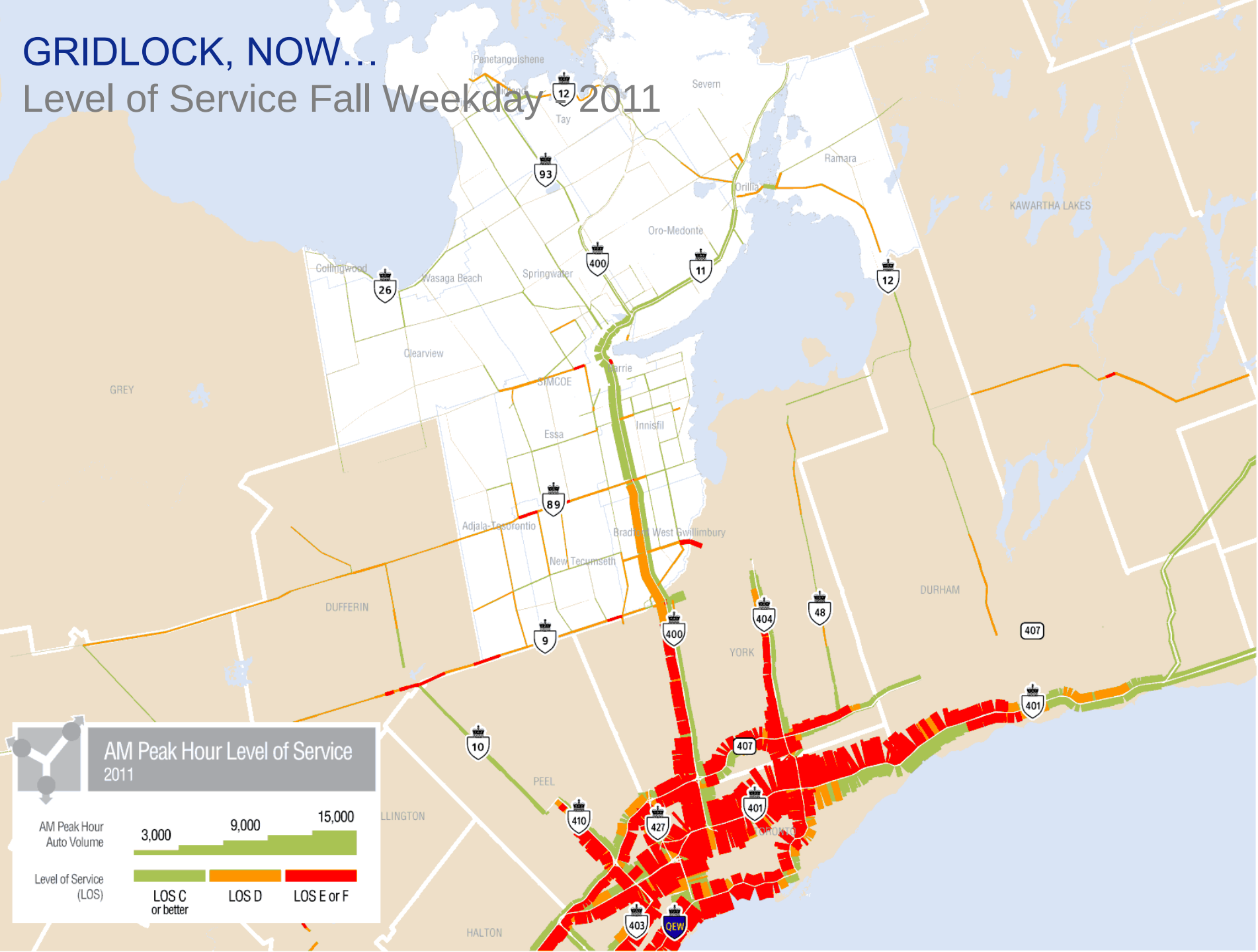
Air Quality

- Increasing health impact estimates – OMA estimate in 2009 of 9,500 deaths annually in Ontario
- Over 350 deaths annually in Simcoe Muskoka



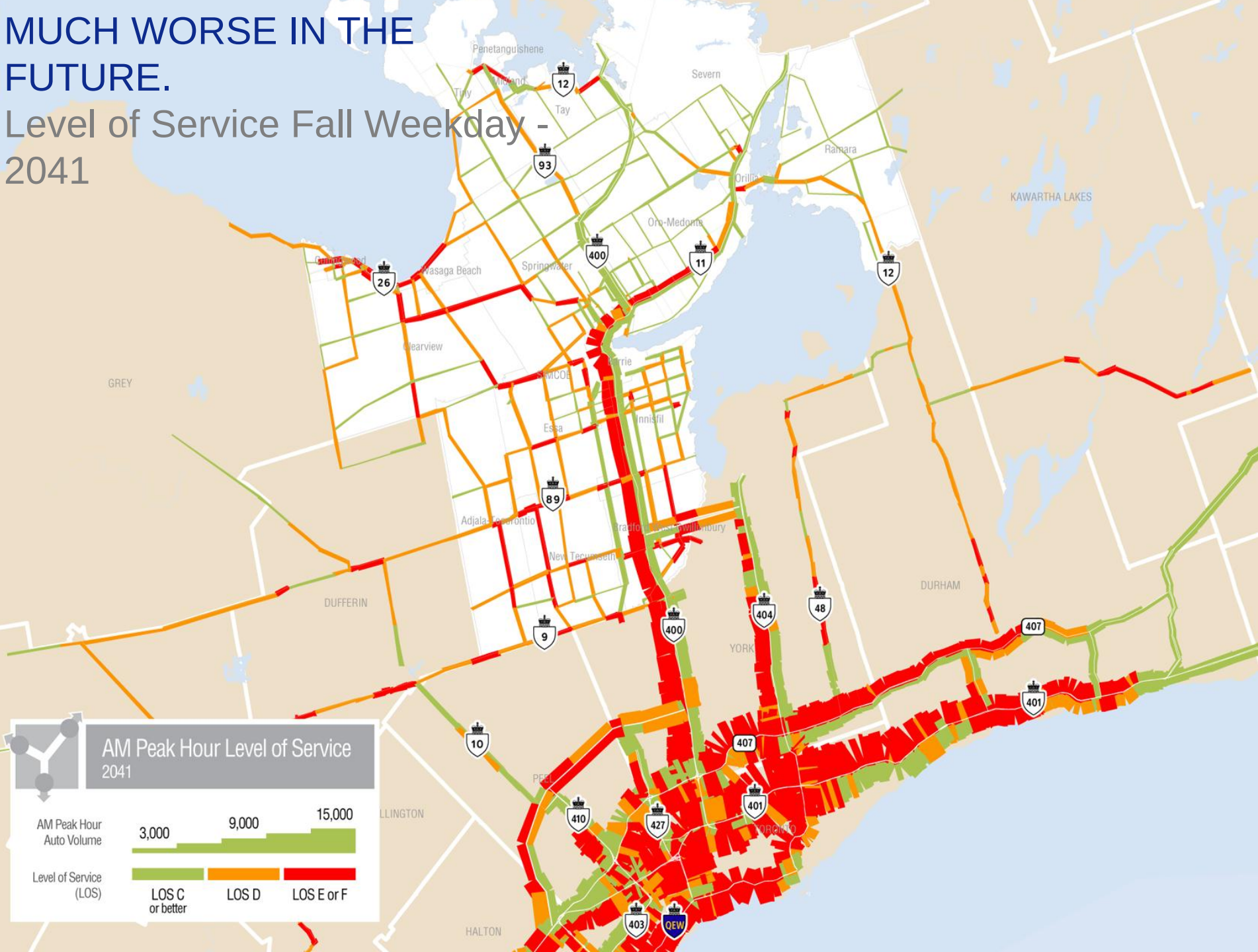
GRIDLOCK, NOW...

Level of Service Fall Weekday 2011



MUCH WORSE IN THE FUTURE.

Level of Service Fall Weekday - 2041



ISSUES:
Climate Change

“A triumph that I could swim in such ferocious conditions but a tragedy that it's possible to swim at the North Pole.”

Lewis Gordon Pugh, July 16, 2007

Many have made the connection

- World Health Organization – European transportation and physical activity collaboration
- Ontario Medical Association – obesity and air quality reports
- Ontario College of Family Physicians reports on Urban Sprawl
- Ontario Chief MOH reports in 2004 and 2009
- The Province of Ontario – Places to Grow
- Ontario Professional Planners Institute
- Heart and Stroke Foundation
- Canadian Index of Wellbeing
- Canadian Medical Association – built environment review paper
- Ontario Public Health Sector Strategic Plan
- Reports of many local Public Health Units



Physical Activity- Walkable Communities

- An analysis of studies in 6 communities found that on average, residents in highly-walkable neighbourhoods took twice as many walking trips as people in less walkable neighbourhoods. Most of the increase was due to walking for errands or to go to work.^[1]



[1] Saelens, B.E., Sallis, J.F., & Frank, L.D., *Environmental Correlates of Walking and Cycling: Findings From the Transportation, Urban Design and Planning Literatures*, *Annals of Behavioural Medicine*, 2003.

Obesity – Proximity and Mixed Use

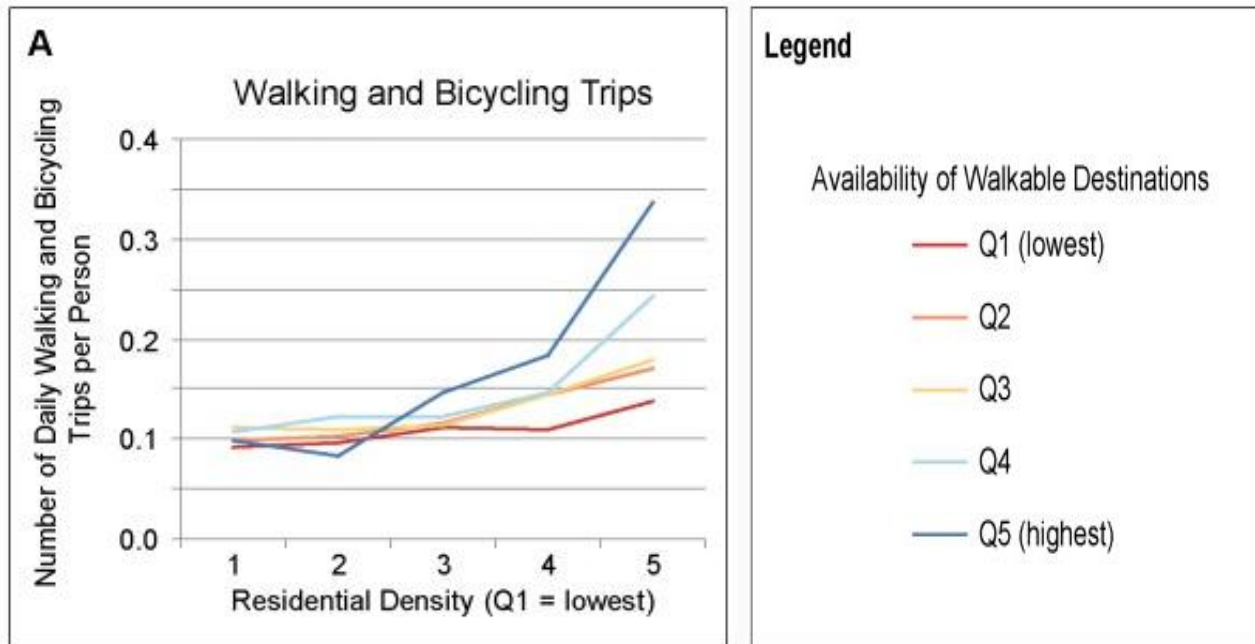
- People who live in neighbourhoods with a mix of shops and businesses within easy walking distance have a 35% lower risk of obesity.^[1]



^[1] Frank, L.D., Andresen, M.A., & Schmid, T.L., Obesity Relationships With Community Design, Physical Activity, and Time Spent in Cars”, American Journal of Preventive Medicine, 2004.

Walkable destination in Ontario

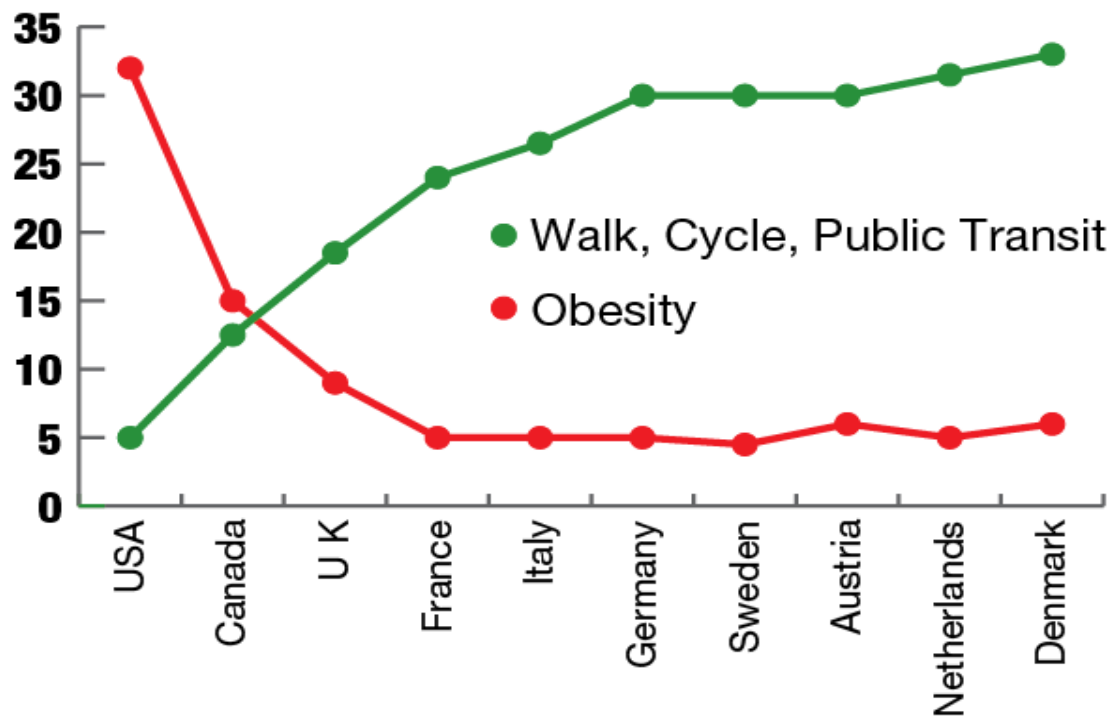
Transportation Behaviors and Health Outcomes by Residential Density and Availability of Walkable Destinations.



Booth GL, Glazier RH, Creatore MI, Weyman JT, Fazli G, Matheson FI, et al. (2014) Density, Destinations or Both? A Comparison of Measures of Walkability in Relation to Transportation Behaviors, Obesity and Diabetes in Toronto, Canada. PLoS ONE 9(1): e85295 doi:10.1371/journal.pone.0085295

Auto-dependency and obesity?

Obesity falls sharp with increased walking, cycling and transit use.



Recreation alone is not the answer



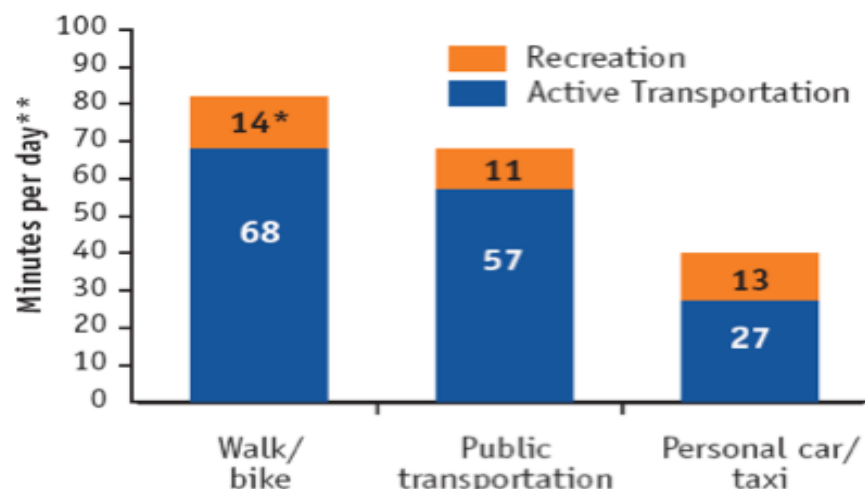
Recreation alone is not the answer



Utilitarian versus Recreational Activity



Average Daily Active Transportation and Recreational Activity Among New Yorkers Who Work Outside the Home



Transportation used for most of commute

*Due to small numbers, estimate should be interpreted with caution.

**Minutes of at least moderate physical activity.

Source: Physical Activity and Transit Survey Wave 1, 2010.

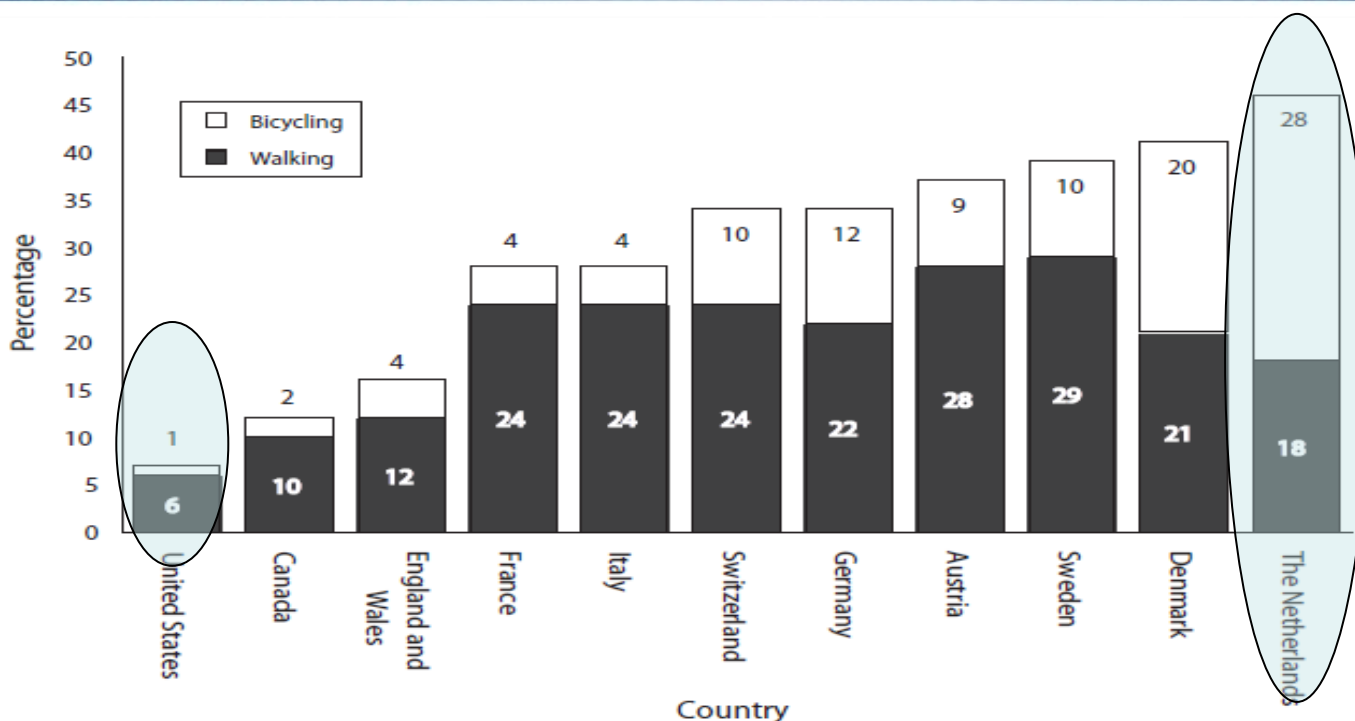
SOURCE: DOWELL D, OLSON, COREY C, HOLDER-HAYES E, KHEIRBEK I, CAFFARELLI A. HEALTH BENEFITS OF ACTIVE TRANSPORTATION IN NEW YORK CITY, NYC VITAL SIGNS SPECIAL REPORT 2011, 10(3): 1-4.

Built Environment & Air Quality

- Living near heavy traffic = 2.5 years loss of life (Finkelstein et al, Am J Epi, 2004)
- Atlanta Olympics 1996: increased public transportation = 22% reduction in traffic, 28% reduction in ozone, 41.6% reduction in ER visits for asthma (Friedman et al, 2001)
- Sequence of associations – community design impacts on mode of transportation; more vehicles used, more trips taken, more miles traveled impacts on amount of emissions; impacts on air quality; impacts on health (Frumkin et al, 2004)



More walking/cycling in the Netherlands....

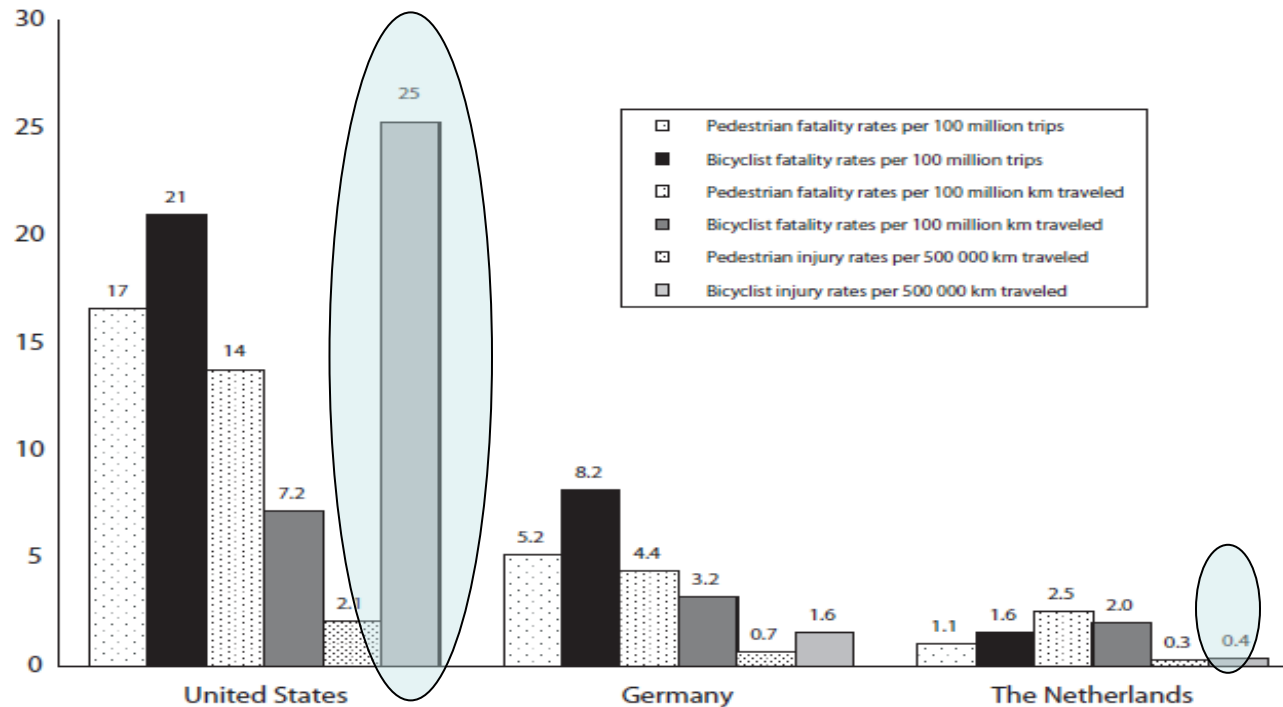


Note. Modal split distributions for different countries are not fully comparable owing to differences in trip definitions, survey methodologies, and urban area boundaries. The distributions given here are intended to show the approximate differences among countries and should not be used for exact comparisons.

Source. Transportation Research Board,²⁹ Table 2-2, p. 30.

FIGURE 1—Percentage of trips in urban areas made by walking and bicycling in North America and Europe, 1995.

...because it's a lot safer



Source. US Department of Transportation^{11,12}; Centers for Disease Control and Prevention¹³; German Institute of Economic Research¹⁶; German Federal Statistical Office¹⁷; German Federal Traffic Institute¹⁸; Statistics Netherlands⁹; and Dutch Ministry for Transport, Public Works and Water Management.²⁰

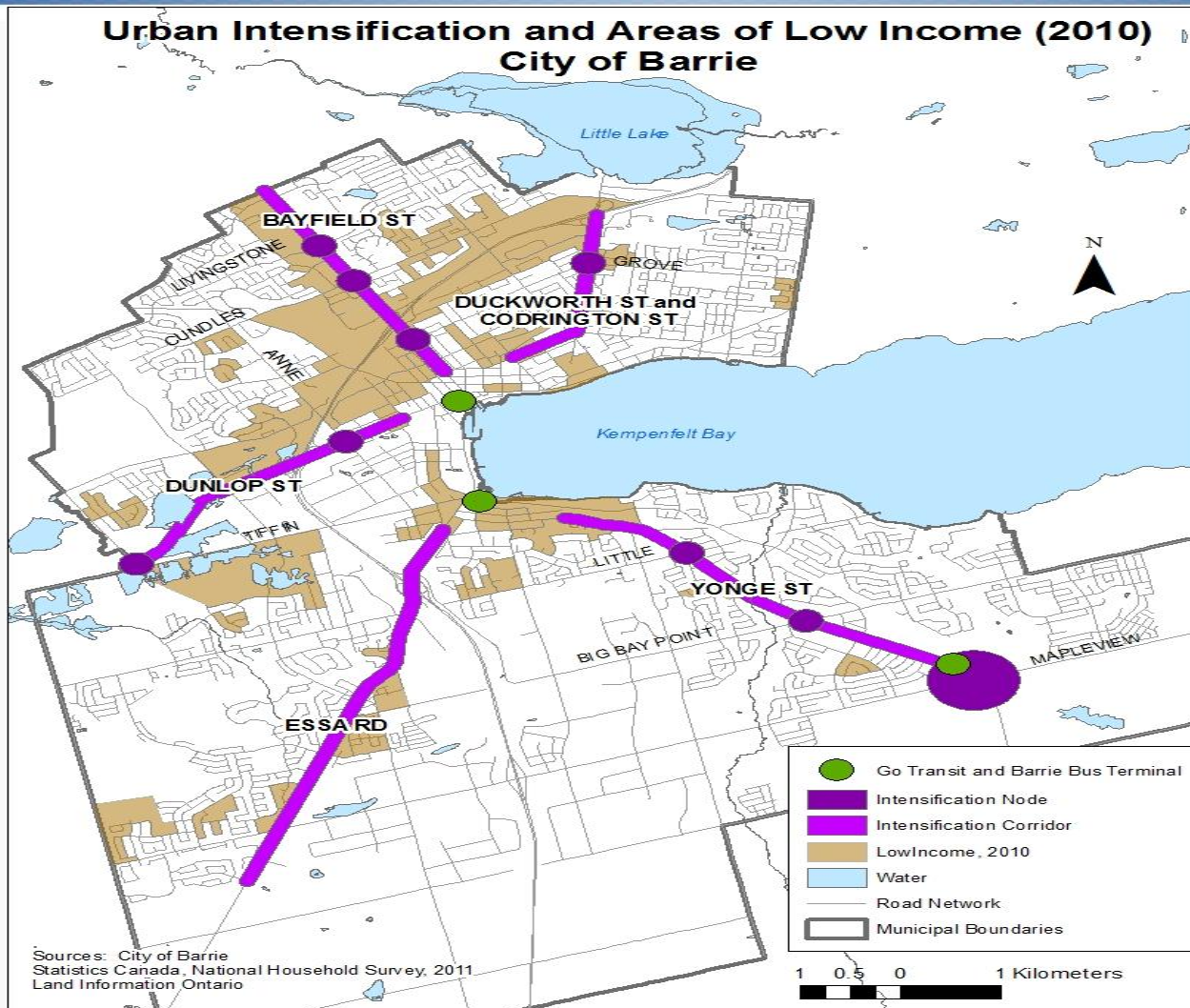
FIGURE 3—Pedestrian and bicycling fatality rates and nonfatal injury rates in the United States, Germany, and The Netherlands, 2000.

Social Capital – Cost of Commuting

- “For each additional 10 minutes spent in daily commuting time cuts involvement in community affairs by 10 per cent.” [\[1\]](#)
- The intellectual and emotional development of children is more advanced in communities that are walkable and that combine a mix of land uses (Gilbert & Obrien, 2005)



Walking Access for Lower Income People



Healthy food in every neighbourhood

- Healthy food in easy reach – how?
 - Small- to medium-size grocery store in every neighbourhood.
 - Produce stands near well-visited places (strip malls, bus stations, parks, schools ...).
 - “Year round” farmers’ market location(s).
- Community design – ideas to consider:
 - Zoning changes (e.g. to allow produce stands in all zoning districts).
 - Incentives (e.g. to attract food stores to underserved areas).
 - Access to shelter, water, electricity (e.g. for farmers’ markets).
 - Location of affordable housing (e.g. close to grocery stores, farmers’ markets).
 - Promotion and support of community gardens.



A happy coincidence

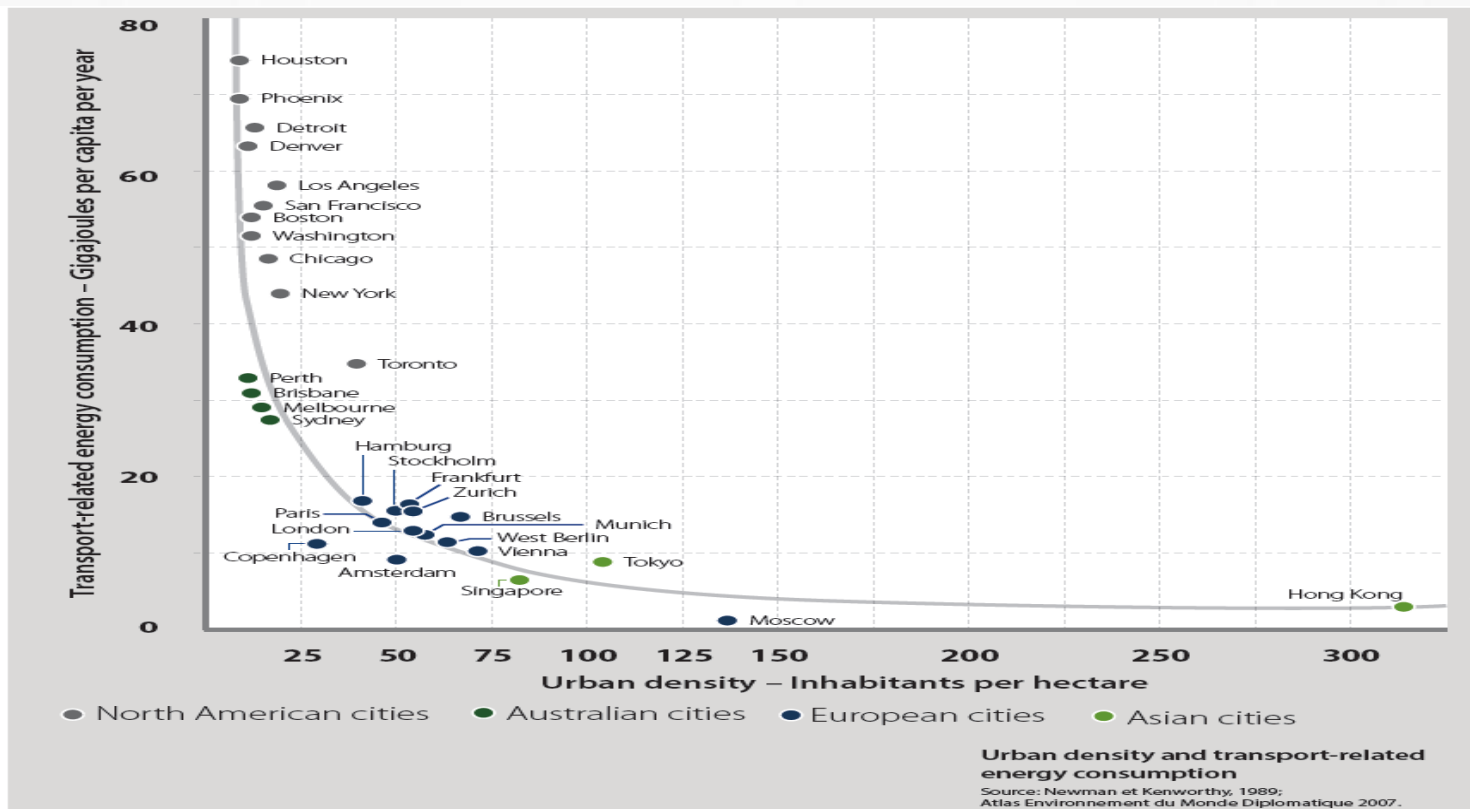
Healthy design also mitigates climate change

LEED for Neighborhood Development criteria:

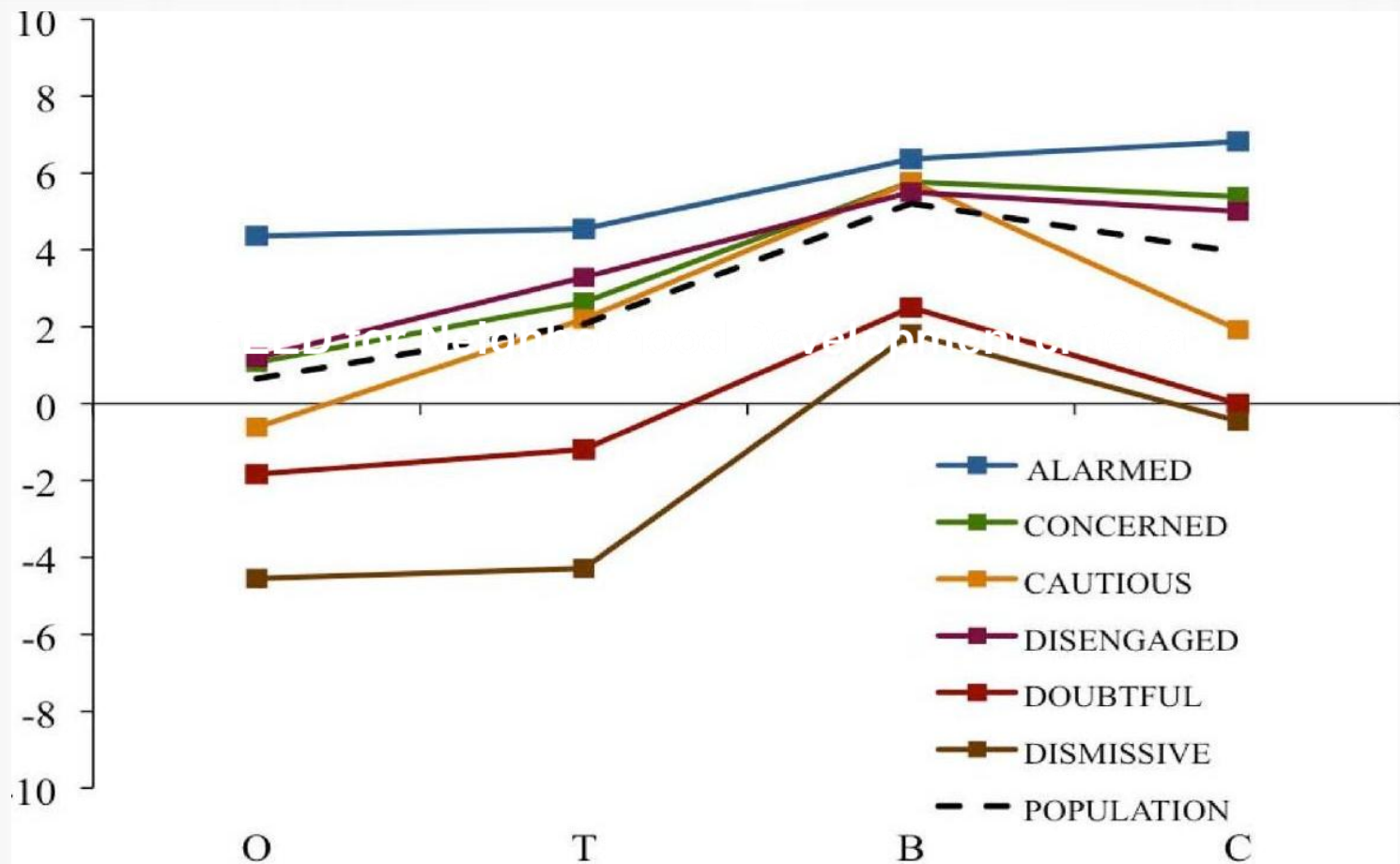
- Walkable Streets
- Compact Development
- Connected and Open Community
- Mixed-Use Neighborhood Centers
- Mixed-Income Diverse Communities
- Reduced Parking Footprint
- Street Network
- Transit Facilities
- Transportation Demand Management
- Access to Civic and Public Spaces
- Access to Recreation Facilities
- *Local Food Production*
- Tree-Lined and Shaded Streets
- Neighborhood Schools
- Green Infrastructure and Buildings

Climate Change Mitigation

Denser metro areas have lower carbon footprints



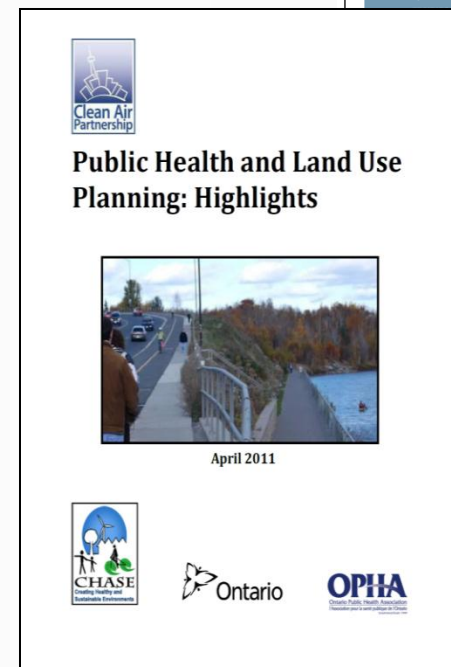
“Health benefits” can prompt support for action on climate change



Source: Reframing climate change as a public health issue: an exploratory study of public reactions. Maibach, EW, et .al. BioMed Central Public Health. 2010 Jun

Public Health's more recent mandate with the Built Environment

- **Official mandate – the Ontario Public Health Standards**
 - Health Hazard Prevention and Management
 - Chronic Disease Prevention
- **Public Health's evolving interest in the Built Environment**
 - Physical Activity
 - Healthy Foods
 - Injuries
 - Air Quality
 - Climate Change
 - Water Quality



Many Health Units have reviewed the literature on the built environment...

Sustainable Halton

Physical Activity and the Built Environment

May 2007



Healthy Rural Communities: Strategies and Models of Practice

Authors:
Wayne Caldwell
Paul Kneehling
Jennifer Hird
Suzanna Kaptur

Support from:
Elgin St. Thomas Public Health
Chatham-Kent Public Health Unit

October, 2013

Healthy Rural Communities: Strategies and Models of Practice

Building Healthy Communities Together: Active and alternative transportation to support healthy living in Grey Bruce

Prepared for:
Operation Safe Strong Clean Committee,
Grey Bruce Health Unit, Owen Sound, ON

Prepared by:
Tammy Aitken
Jason Cranny
Crystal Ferguson
Robert Graham
Bev Middleton

December 23, 2009



The Impact of the Built Environment on the Health of the Population: A Review of the Review Literature

November 2007

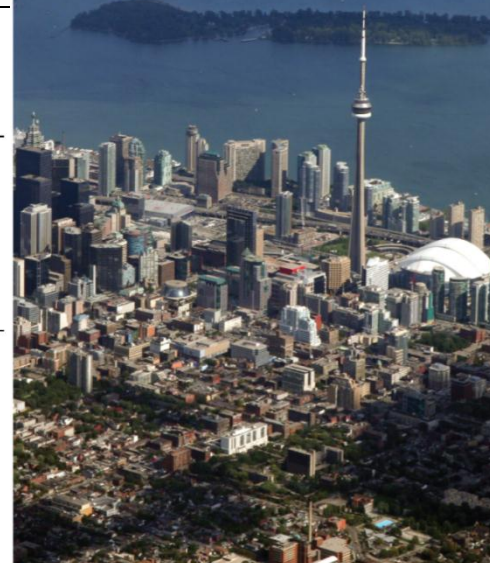
Authors:

Megan Williams, Health Promotion Specialist, Corporate Service
Myrna Wright, Health Promotion Specialist, Healthy Living Service,
Simcoe Muskoka District Health Unit



Healthy Toronto by Design

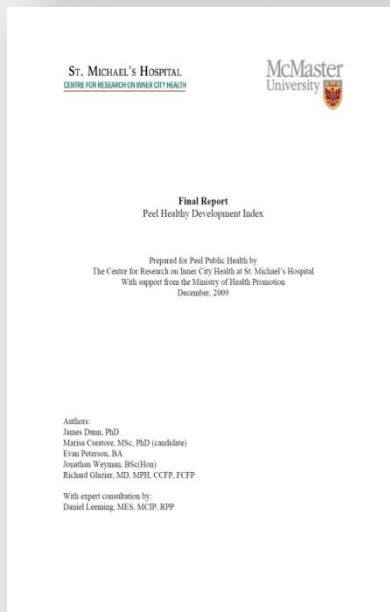
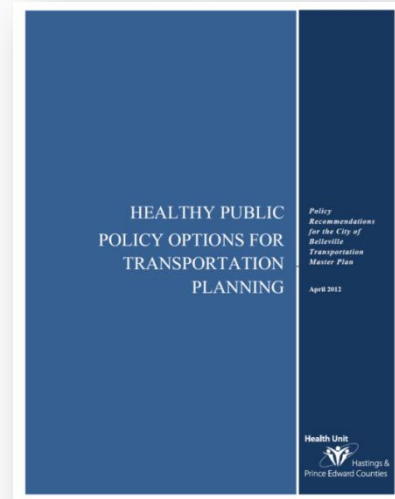
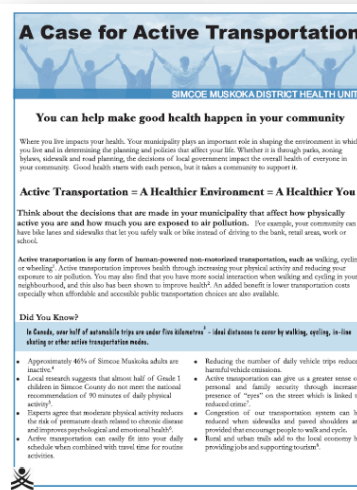
October 2011



416.338.7600 toronto.ca/health Toronto Public Health



...and have advocated for healthy design



Mapping the ability to walk...

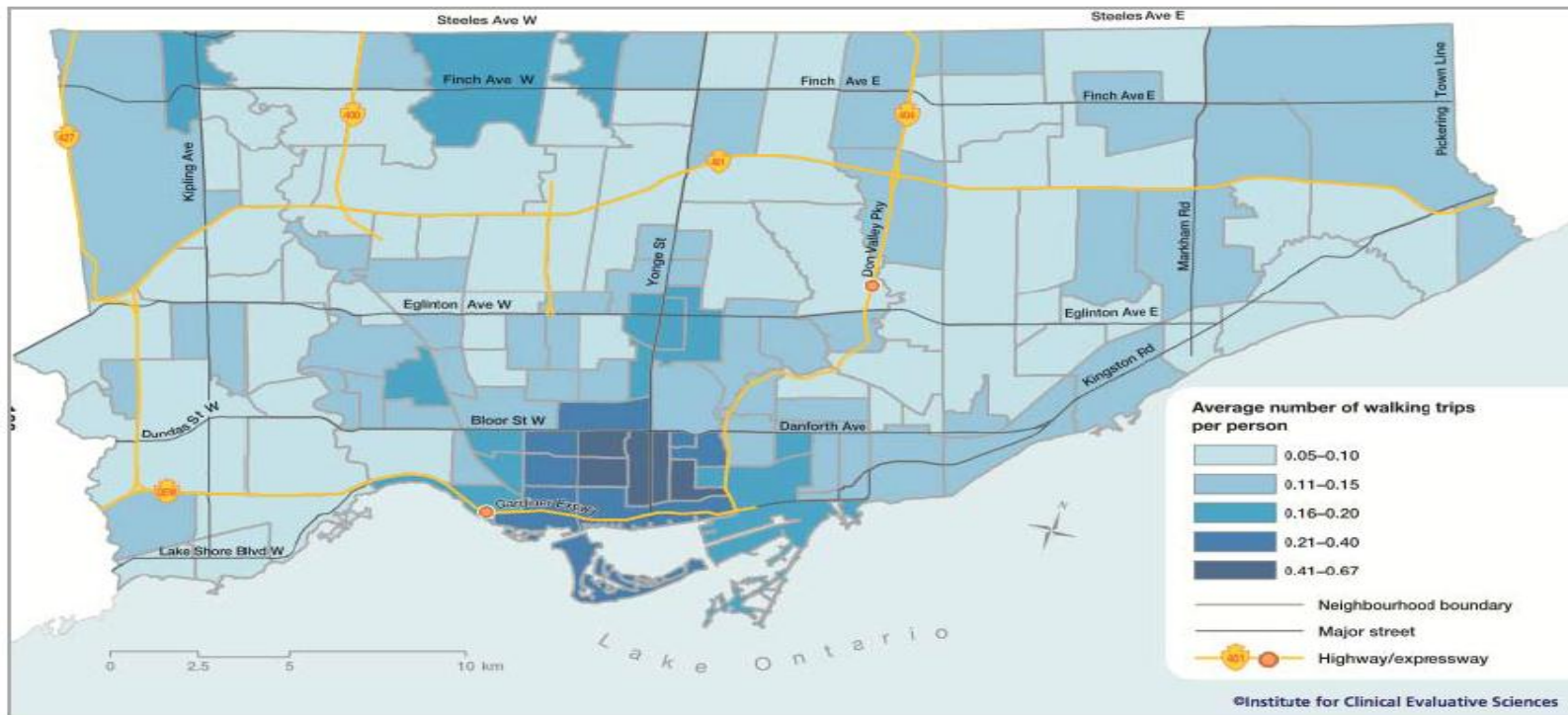
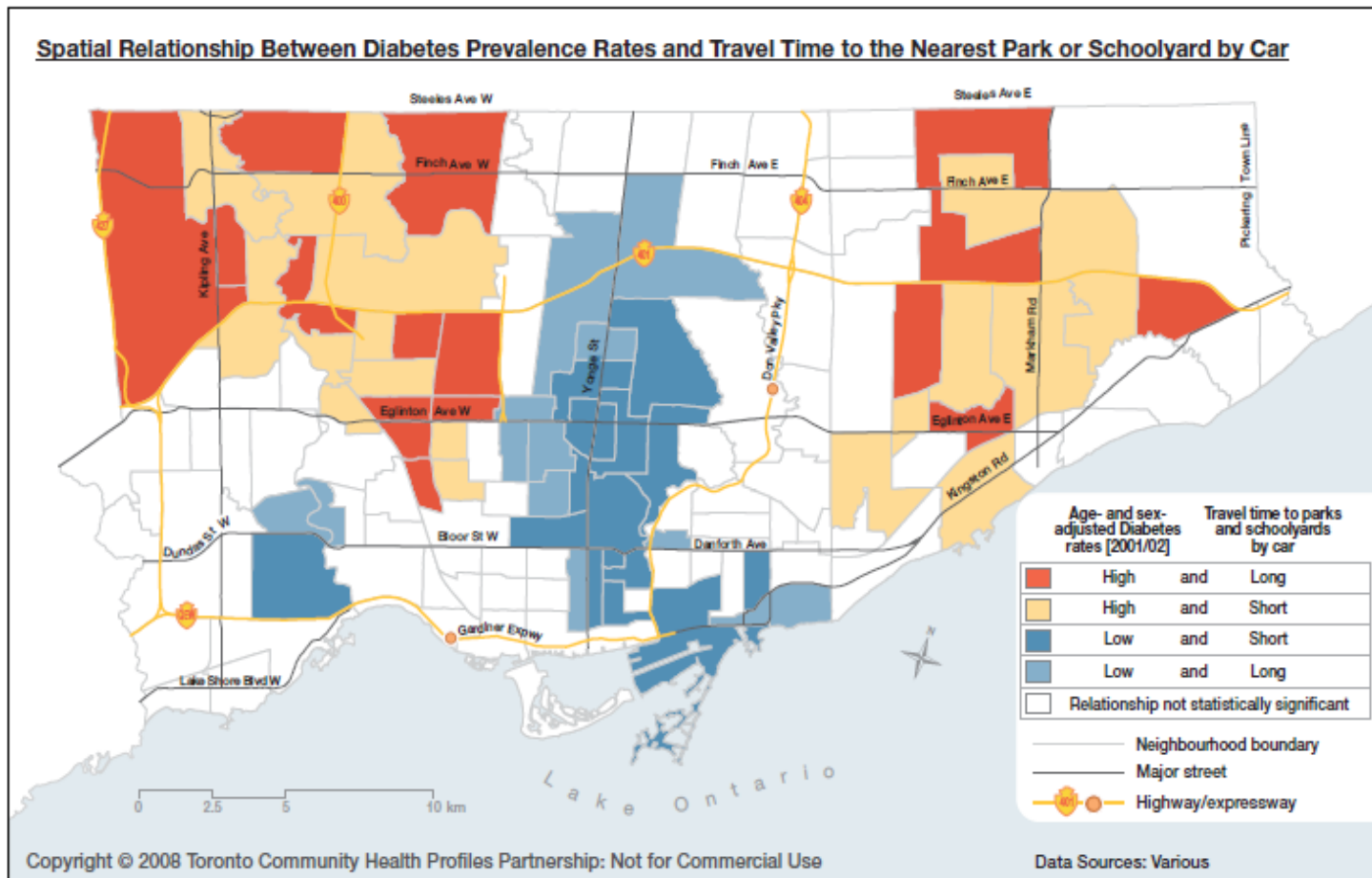


Figure 15: Daily walking trips per person

Source: Glazier et al. 2007

... and mapping the health impacts



Demonstrating that more can be achieved

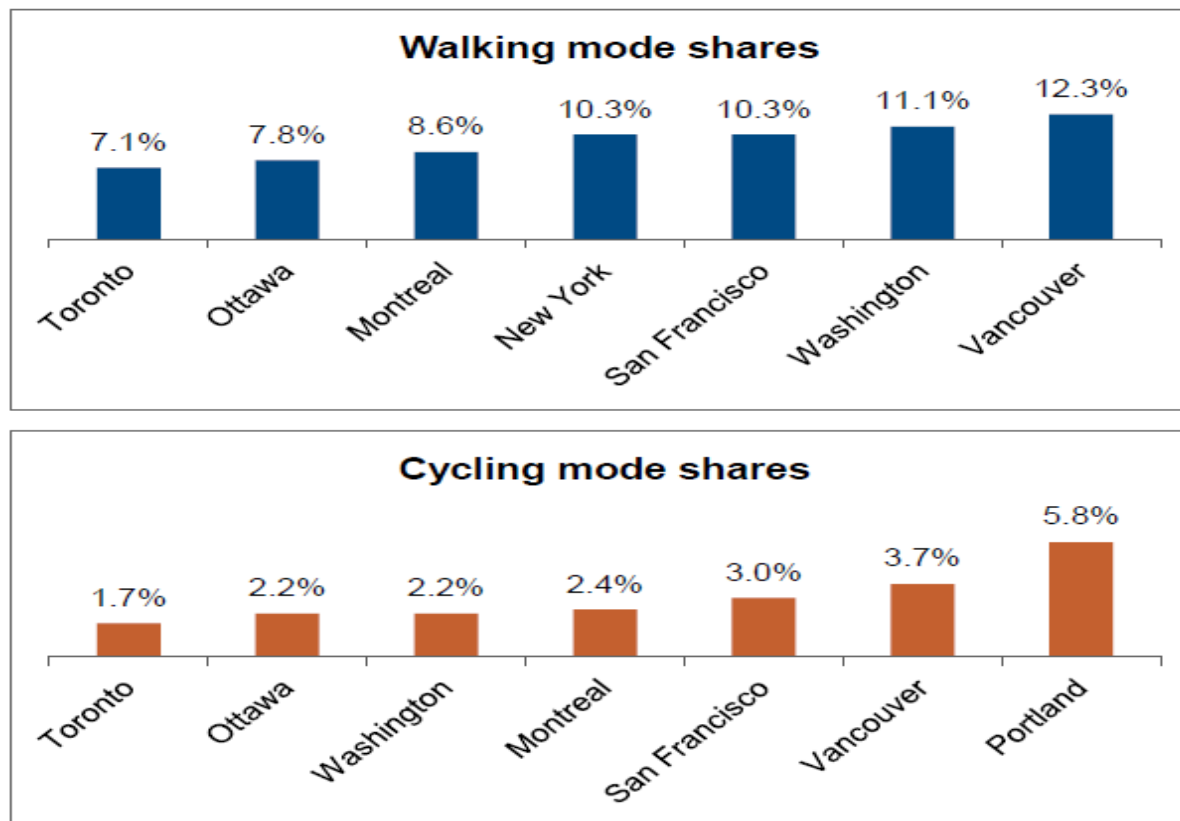


Figure 7: Active commuting mode shares of North American cities

Data: Pucher and Buehler 2011, TransportPolitic 2011

Mortality from traffic is also very much about air quality

Figure 16.1

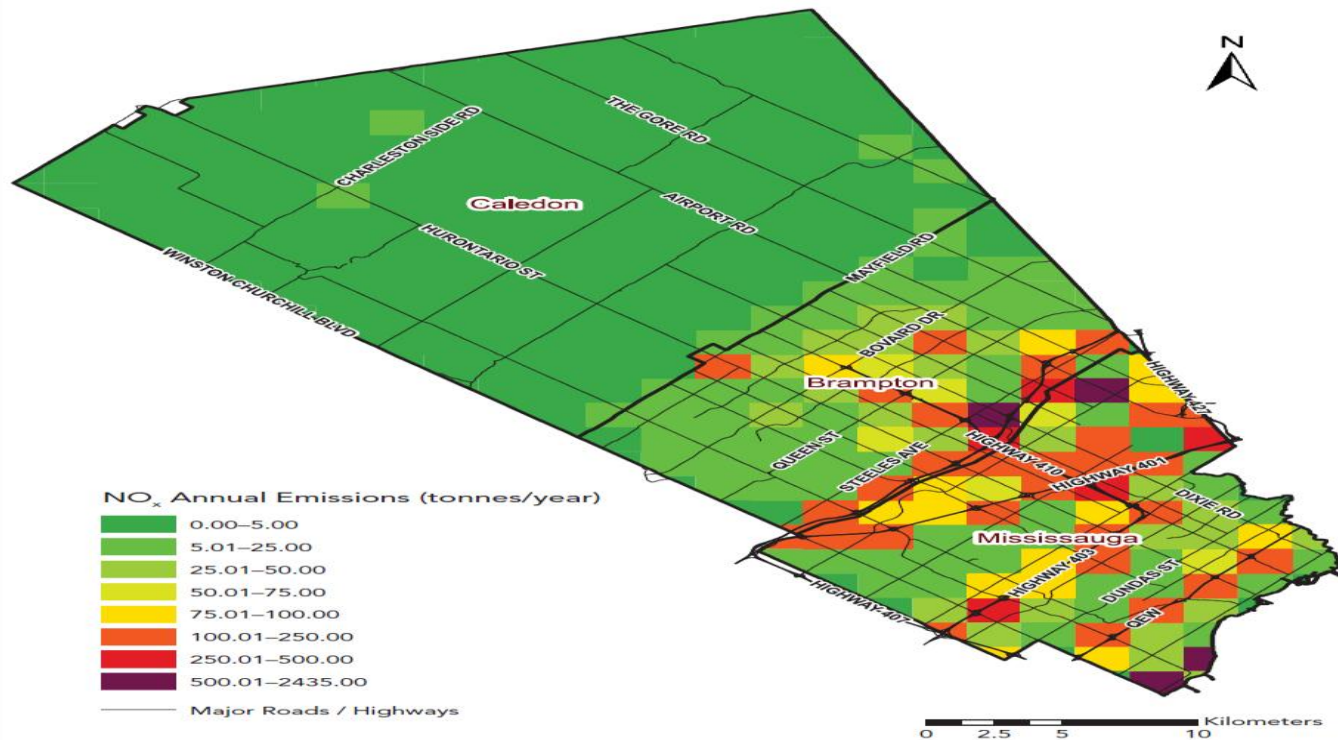
Estimated Annual Number of Premature Deaths Attributable to O_3 , $PM_{2.5}$, CO , SO_2 , NO_2 by Age Group, Peel, 2005–2026



† O_3 - ozone, $PM_{2.5}$ - fine particulate matter, CO - carbon monoxide, SO_2 - sulphur dioxide, NO_2 - nitrogen dioxide
Source: ICAP Version 5.0, 2005, Ontario Medical Association

Mapping the air quality impact near traffic

Map 16.2
Annual Emissions of Nitrogen Oxides (NO_x)
Peel, 2006

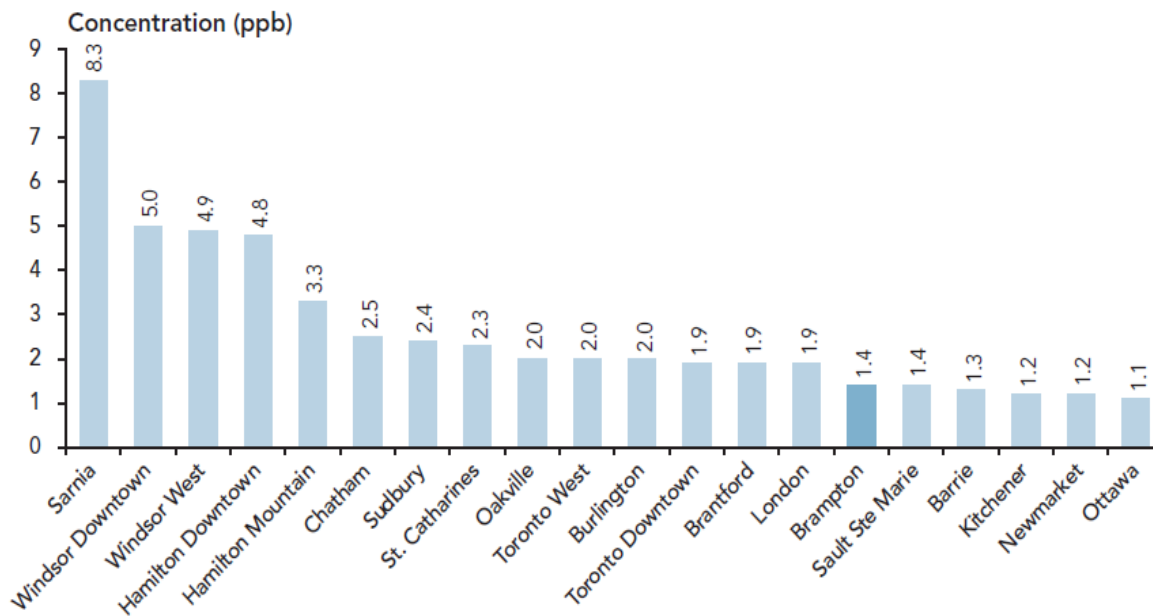


Source: R. Singh and A. Ciccone. Technical Report:
An Evaluation of Air Quality in Peel Region, 2008.

We can do better - on air quality...

Figure 16.3

Sulphur Dioxide Annual Means by Selected Ontario Municipalities,
2006



Note: Data collected from ambient sites. Ontario's annual ambient air quality criteria = 20 ppb.

Source: Ontario Ministry of the Environment, Environmental Monitoring and Reporting Branch, 2006

... and on injuries

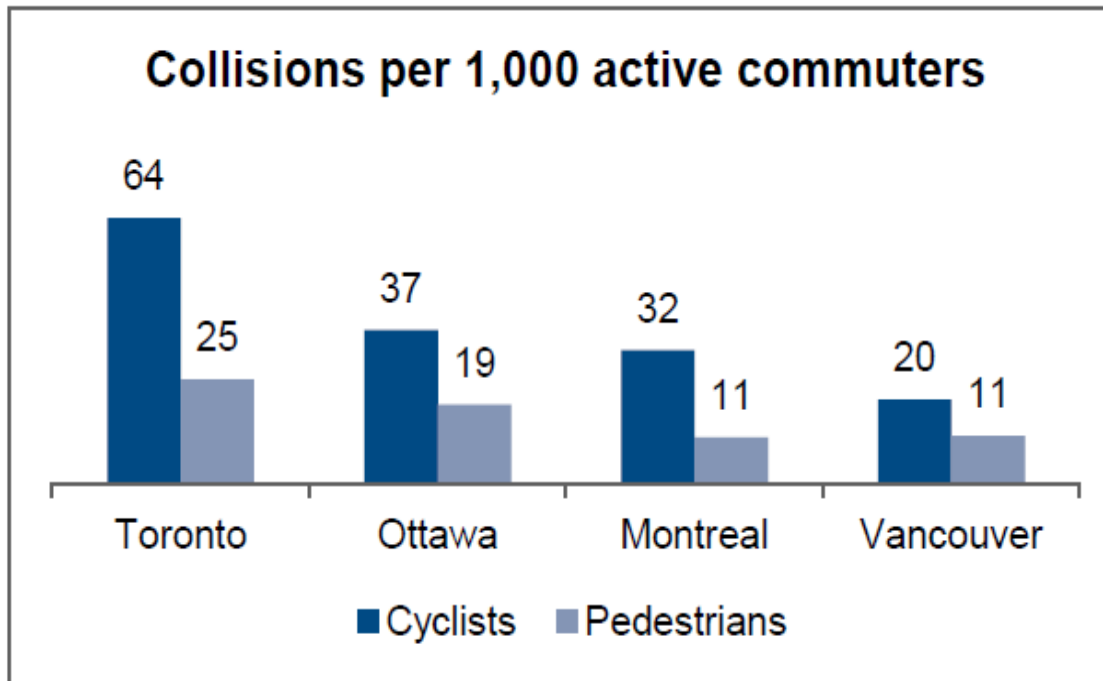


Figure 12: Active commuting collision rates in Canadian cities (per 1,000 commuters)

Data: 2006 Statistics Canada census data, City of Toronto Traffic Safety Unit 2011a, 2011b

GTHA MOHs speaking up for healthy design



Many reasons for Mixed Use Design

BENEFITS

HEALTH

- ↑ Physical activity
Prevent **184** premature deaths
(\$1.2 billion)/ year*
Prevent **1000** cases of diabetes a year*
- ↓ Traffic-related air pollution
Prevent **154** premature deaths
(\$1 billion)/year*†
Prevent over **90** hospitalizations/year**
- ↑ Other health benefits
More transportation options for all • More support for aging population • Improved mental health and social connectivity
Fewer injuries

NON-HEALTH

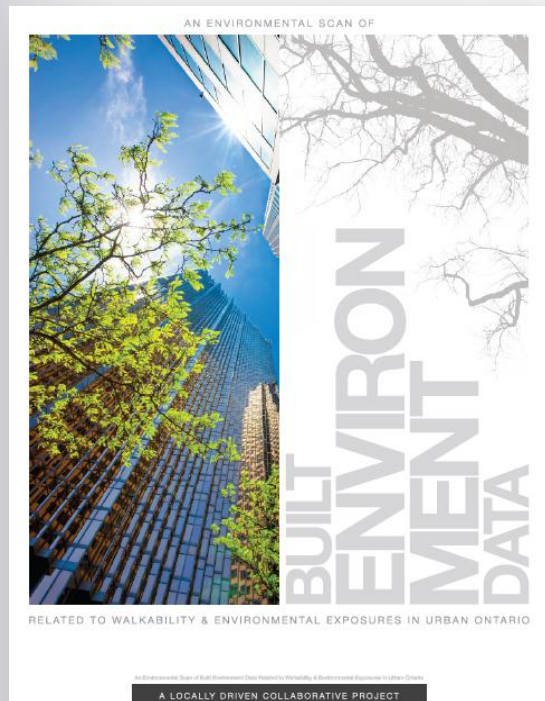
- ↓ Decrease Congestion ↑ Increase Productivity
Average future commute:
Without Big Move: **109** minutes • With Big Move: **77** minutes[±]

Economic cost of congestion without public transit investment:
2006: **\$6** billion/year • 2031: **\$12** billion/year[±]
- ↑ Environmental Sustainability
Transportation greenhouse gas emissions:
Without Big Move: Up **30%** • With Big Move: Down **1%**[±]
Protection of natural space, heritage sites and farmland
- ↓ Municipal Infrastructure Costs
Down **38%** upfront costs
Down **14%** annual operating costs[¥]

Place-making in our communities



Provincial Leadership PHO – Knowledge Exchange



An Environmental Scan of Built Environment Data Related to Walkability & Environmental Exposures in Urban Ontario

PHO Grand Rounds, January 8, 2012

Presenters:

Popy Dimoulas-Graham, Epidemiologist Consultant
Helen Doyle, York Region Public Health

1

Public health approaches to measuring the urban built environment and its effects on health: A focus on diabetes.

Gillian Booth
Marisa Createore

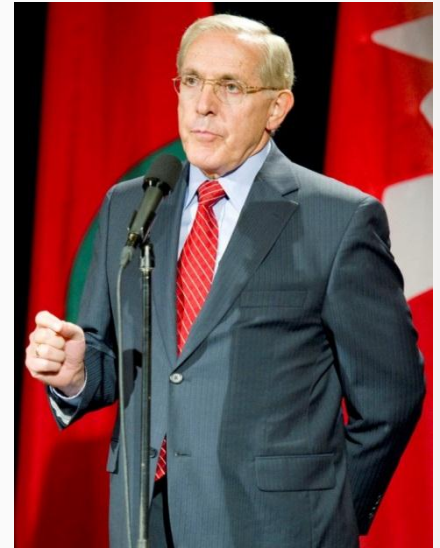
Li Ka Shing Knowledge Institute,
St. Michael's Hospital
Institute for Clinical Evaluative Sciences

Public Health Ontario Grand Rounds, November 20, 2012

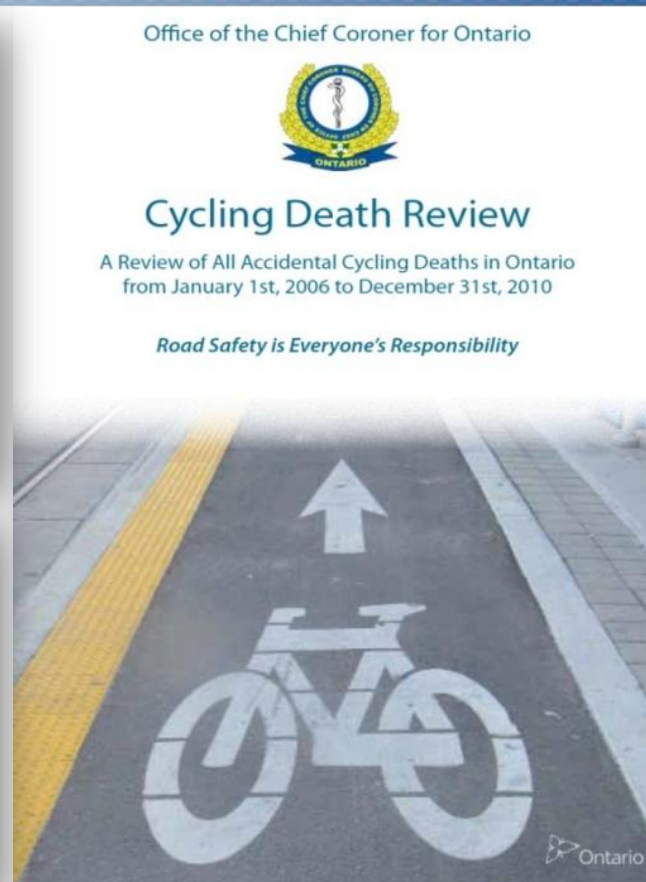
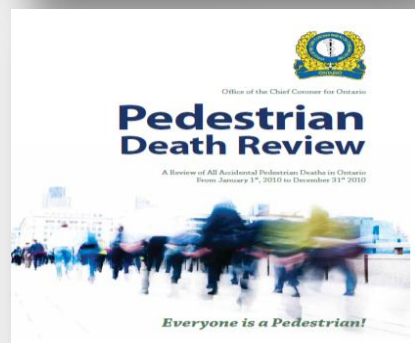
Influence of the Built Environment on Physical Activity, Diet, and Obesity in Children

Ian Janssen, Ph.D.
CRC Chair in Physical Activity and Obesity
Queen's University
Kingston, ON

Provincial Advocacy



Provincial Leadership in Ontario



Make No Little Plans: A Table for Healthy Built Environments

Strategic Goal #4 Promote healthy environments – both natural and built

Collective Area of Focus #5: Built Environment

Proposed Actions

- i. Define the scope and role for the public health sector in addressing and mitigating the health impact of the built environment.
- ii. Enhance provincial capacity to generate evidence to guide provincial and local public health collaboration with municipal planners, transportation planners, public works, parks and recreation and others who influence the built environment.



Final Thoughts

- People's health has always been about their living conditions.
- We have unwittingly created living environments that challenge our health gains – and the sustainability of our ecosystem.
- Places to Grow helped launch a surge of activity on the BE throughout the province.
- Public Health has joined the call to remake our communities for health.

