

# **Cycling & Walking:**

## **GGR424 - Transportation Geography & Planning**

Jeff Allen

University of Toronto

January 24, 2022

## Today:

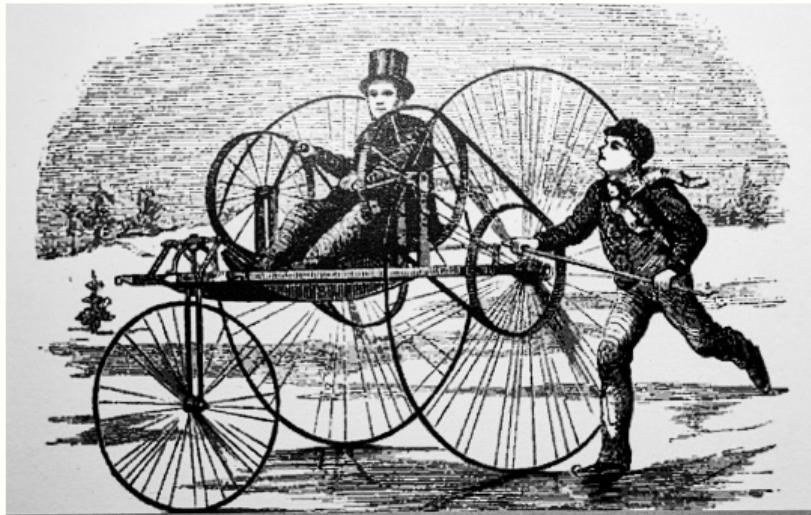
- ▶ Benefits of active travel
- ▶ Safety issues and other concerns
- ▶ Designing safer infrastructure
- ▶ Designing "complete streets"
- ▶ Networks & connectivity



## Active travel - non-motorized mobility

e.g. walking and cycling, but also rollerblading, skateboarding, ice-skating, kick scooters, cross-country skiing, etc.

Can be for travelling to a specific location, or recreational travel not directed to a particular destination



# Benefits of Active Travel

Can replace trips by other modes (driving, transit), meaning reduced congestion, pollution, GHG emissions, etc.

The screenshot shows a PubMed search results page. At the top, there is a search bar with the text 'PubMed.gov' and a 'Search' button. Below the search bar are links for 'Advanced' and 'User Guide'. A row of buttons for 'Save', 'Email', 'Send to', and 'Display options' follows. The main content area displays a single article record. The article title is 'Active travel: a climate change mitigation strategy with co-benefits for health' by Chris E Rissel. It includes a link to 'NSW Public Health Bull. Jan-Feb 2009;20(1-2):10-3. doi: 10.1071/nb08043'. Below the title are links for 'Affiliations + expand', 'PMID: 19261210 DOI: 10.1071/nb08043', and 'Free article'. The abstract section starts with the heading 'Abstract' and a paragraph about the benefits of active travel. To the right of the article details are sections for 'FULL TEXT LINKS' (with links to 'CROSS PUBLISHING FULL TEXT ARTICLE' and 'crossmark FULL TEXT'), 'ACTIONS' (with 'Cite' and 'Favorites' buttons), 'SHARE' (with icons for Twitter, Facebook, and LinkedIn), and 'PAGE NAVIGATION' (with links to 'Title & authors' and 'Abstract').

<https://pubmed.ncbi.nlm.nih.gov/19261210/>

# Benefits of Active Travel

Plenty of research highlights health benefits of active travel, e.g.

Journal List > Am J Public Health > v.100(10); Oct 2010 > PMC2937005

 American Public Health Association Promoting Public Health Research, Policy, Practice and Education 

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[Am J Public Health, 2010 October; 100\(10\): 1986–1992.](#) [PMCID: PMC2937005](#)  
[doi: 10.2105/AJPH.2009.189324](#) [PMID: 20724675](#)

**Walking and Cycling to Health: A Comparative Analysis of City, State, and International Data**

[John Pucher, PhD, <sup>✉</sup> Ralph Buehler, PhD, David R. Bassett, PhD, and Andrew L. Dannenberg, MD, MPH](#)  
► Author information ► Article notes ► Copyright and License information [Disclaimer](#)

This article has been cited by other articles in PMC.

**Abstract** [Go to: ☐](#)

**Objectives.** We sought to determine the magnitude, direction, and statistical significance of the relationship between active travel and rates of physical activity, obesity, and diabetes.

**Methods.** We examined aggregate cross-sectional health and travel data for 14 countries, all 50 US states, and 47 of the 50 largest US cities through graphical, correlation, and bivariate regression analysis on the country, state, and city levels.

**Results.** At all 3 geographic levels, we found statistically significant negative relationships between active travel and self-reported obesity. At the state and city levels, we found statistically significant positive relationships between active travel and physical activity and statistically significant negative relationships between active travel and diabetes.

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**Similar articles in PubMed**

Walking, cycling, and obesity rates in Europe, North America, and Australia. [J Phys Act Health. 2008]

Adult active transport in the Netherlands: an analysis of its contribution to physical activity requirements. [PLoS One. 2015]

Active travel to work and cardiovascular risk factors in the United Kingdom. [Am J Prev Med. 2013]

Improving health through policies that promote active travel: a review of evidence to support integrated health. [Environ Int. 2011]

Environmental correlates of walking and cycling: findings from the transportation, urban design, and planning. [Ann Behav Med. 2003]

[See reviews...](#)

[See all...](#)

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**Cited by other articles in PMC**

Climate Solutions Double as Health Interventions [International Journal of Envir...]

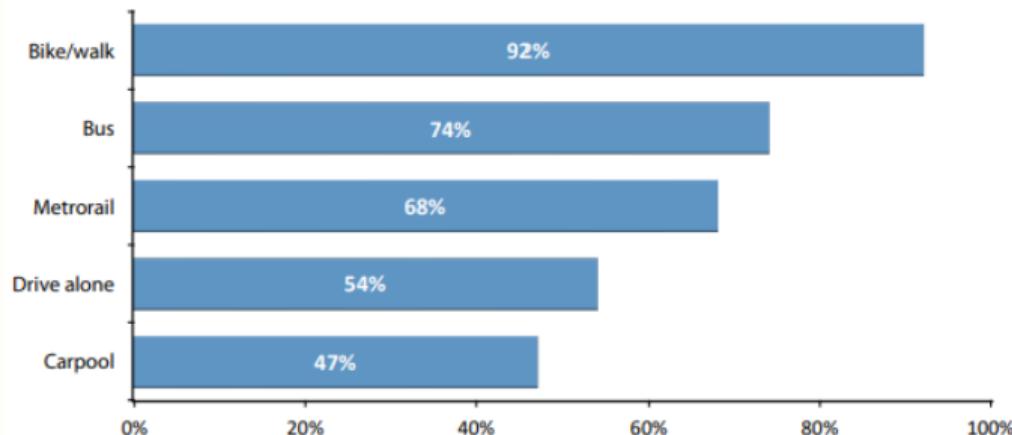
## Benefits of Active Travel

Increased "enjoyment" or "satisfaction" of travel

**Satisfaction with Commute by Primary Commute Mode – Lived in Arlington**

Percent Rating Commute a 4 or 5

(Bike/walk n = 73, Bus n = 63, Metrorail n = 253 Drive alone n = 331, Carpool n = 21)



# Benefits of Active Travel

"studies indicate that creating or improving active travel facilities generally has positive or non-significant economic impacts on retail"

TRANSPORT REVIEWS  
2021, VOL. 41, NO. 4, 401–431  
<https://doi.org/10.1080/01441647.2021.1912849>

 Routledge  
Taylor & Francis Group

OPEN ACCESS 

**Economic impacts on local businesses of investments in bicycle and pedestrian infrastructure: a review of the evidence**

Jamey M. B. Volker  and Susan Handy 

Institute of Transportation Studies, University of California, Davis, CA, USA

**ABSTRACT**  
Local officials in North America frequently face opposition to new or expanded bicycle or pedestrian facilities. The most vocal opponents are usually motorists and local business owners who fear that the removal of or reductions in vehicular parking or travel lanes will reduce patronage from motorists and that any increased patronage from pedestrians or cyclists will not offset the lost revenues. A lack of direct evidence on the economic impacts of facilities on local businesses has made it difficult to support or debunk such fears. A lack of quantitative evidence in particular has prevented the incorporation of such impacts into cost-benefit analyses. The issue has received enough attention from researchers in recent years that a review of the evidence is now warranted. We reviewed the relevant literature and identified 23 studies, focusing on the US and Canada, that either (1) quantified and compared consumer spending between active travellers and automobile users ( $n = 8$ ), or (2) quantified an economic impact to local businesses following the installation of bicycle or pedestrian facilities ( $n = 15$ ). Taken together, the studies indicate that creating or improving active travel facilities generally has positive or non-significant economic impacts on retail and food service businesses abutting or within a short distance of the facilities, though bicycle facilities might have negative economic effects on auto-centric businesses. The results

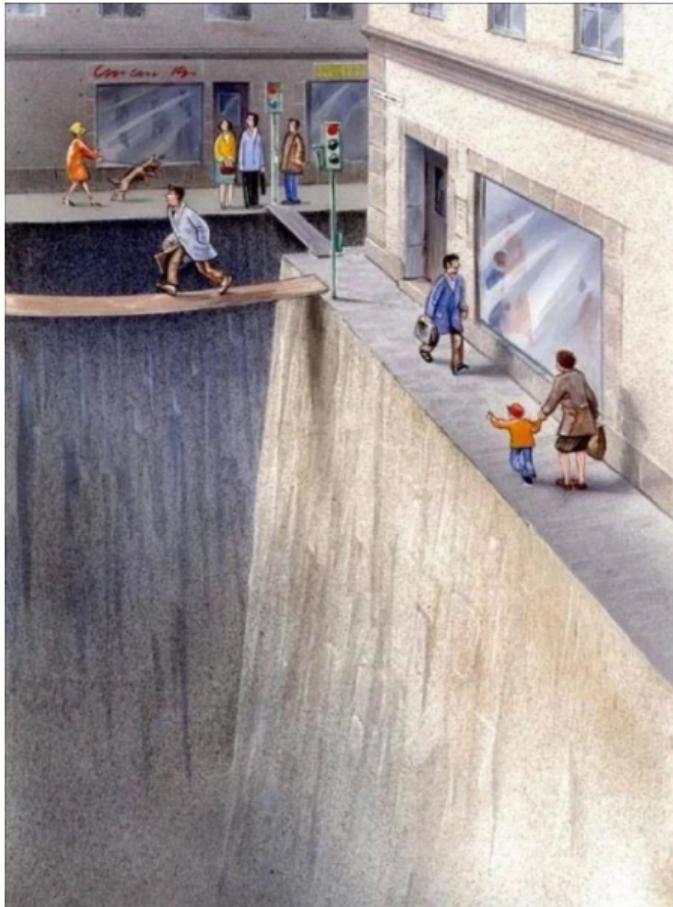
**ARTICLE HISTORY**  
Received 3 November 2020  
Accepted 27 March 2021

**KEYWORDS**  
Bicycle facilities; pedestrian facilities; active travel; local business; economic impacts

## What deters active travel?

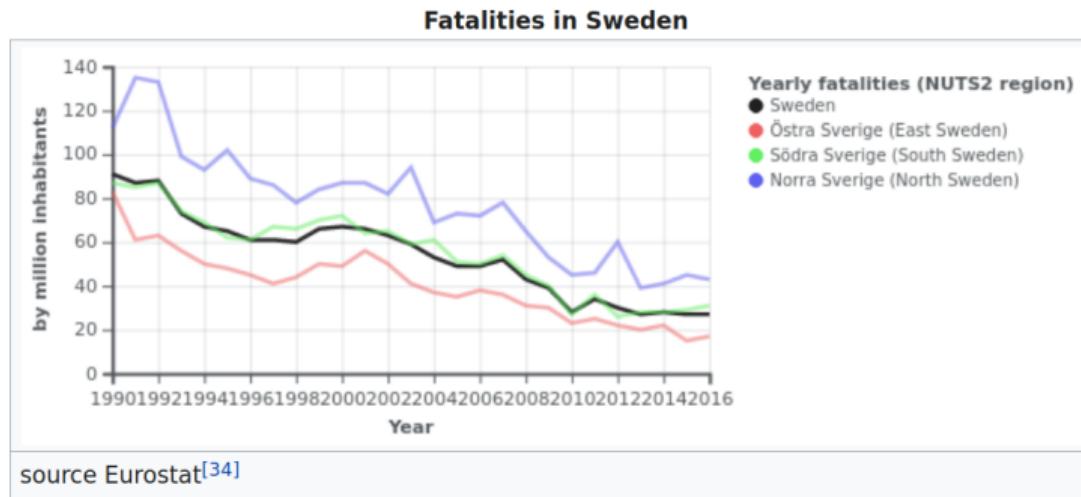
Image by Karl Jilg, commissioned by the Swedish Road Administration in 2014

[https://archive.attn.com/stories/17066/  
illustration-nails-pedestrian-problem-cities](https://archive.attn.com/stories/17066/illustration-nails-pedestrian-problem-cities)

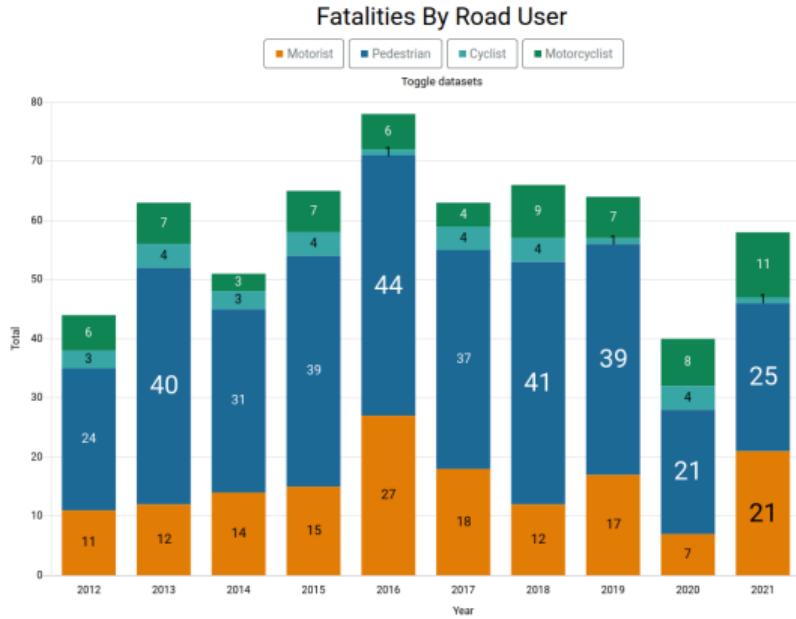


## Vision Zero

- ▶ Road safety strategies aimed reducing road fatalities to zero
- ▶ Started in Sweden in 1997 and has since been implemented in hundreds of cities
- ▶ Focus on design of infrastructure, and responsibility of road/street engineers and designers
- ▶ Accepting inevitability of human error - making accidents less severe



# Vision Zero initiatives in Toronto formally began in 2016



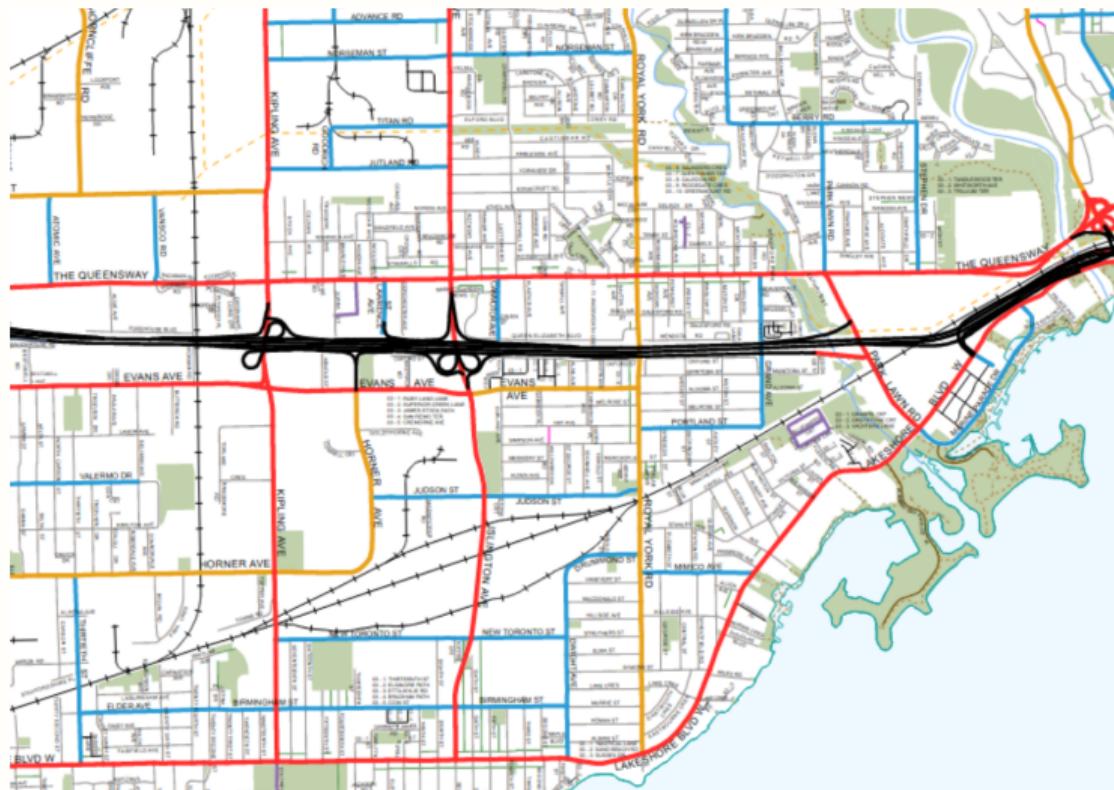
- ▶ "83% of KSI (Killed or Seriously Injured) collisions happen on arterial roadways"
- ▶ "Vulnerable road users have a 95% likelihood of death in a collision at 60 km/hr, while at 40 km/hr the likelihood of death is reduced to 30%"

Many (arterial) roads are predominately designed for cars:



<https://www.youtube.com/watch?v=0RzNZUeUHAM>

# Toronto's Road Classification System:

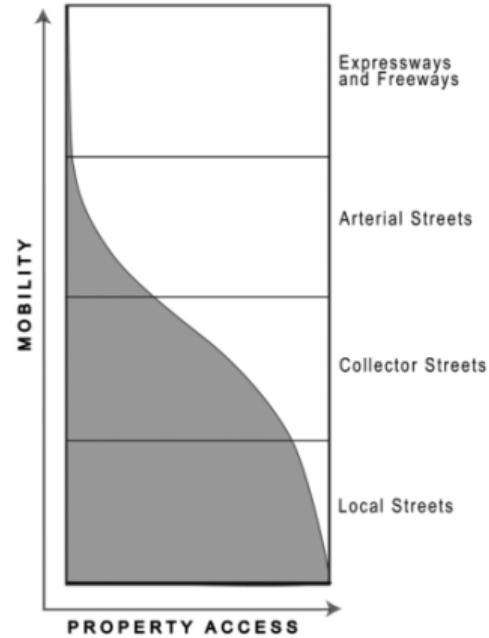


<https://www.toronto.ca/services-payments/streets-parking-transportation/traffic-management/road-classification-system/>

# Toronto's Road Classification System:



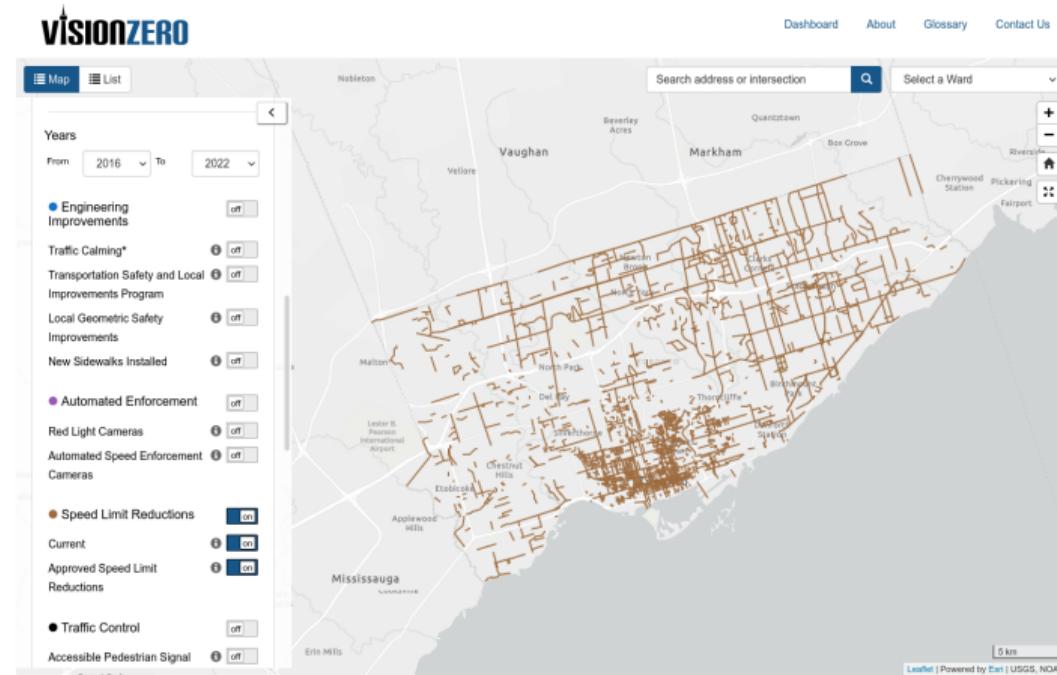
**Figure 5.** An 'Avenue building' being completed along the Queensway, one of Toronto's six-lane suburban arterials. *Source:* Photo by Author.



**Figure 6.** Theoretical trade-off between mobility and access underlying standard road classification systems. *Source:* Author.

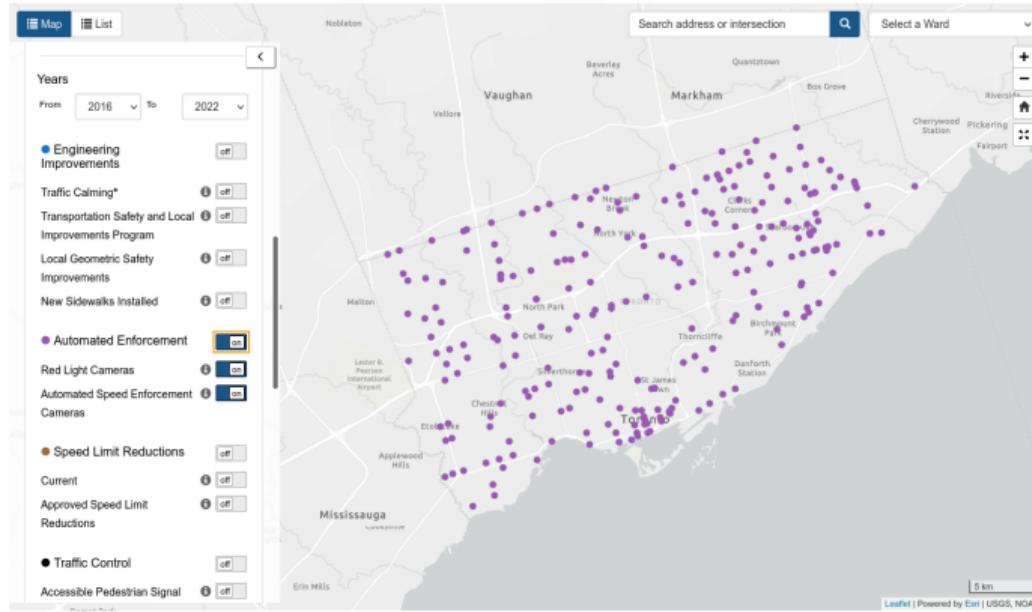
Image from Hess (2009)

# Safer streets: Lower speed limits



<https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/safety-measures-and-mapping/>

# Safer streets: Automated enforcement



<https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/safety-measures-and-mapping/>

# Safer streets: Pedestrian Crossovers



Pedestrian Crossovers (PXOs) are intended for low to moderate volume, low speed roadways (60 km/h or less posted speed), and must not be used where the road volume exceeds 35,000 annual average daily traffic (AADT). PXOs should not be installed at sites where there are heavy volumes of turning traffic, or where there are more than four lanes of two-way traffic or three lanes of one-way traffic. PXOs should not be within 200 m of other signal-protected pedestrian crossings. Parking and other sight obstructions should be prohibited within at least 30 m of the crossings. Regulation 615 of the HTA <sup>12</sup> covers most aspects of required PXO traffic control devices and their placement.

<https://www.toronto.ca/services-payments/streets-parking-transportation/traffic-management/traffic-signals-street-signs/types-of-traffic-signals/pedestrian-crossovers/>

## In This Section

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[Traffic Lights](#)

[Left-Turn Signals](#)

[Pedestrian Countdown Signals](#)

[Pedestrian Scramble](#)

[Flashing Beacons](#)

[Leading Pedestrian Interval](#)

## Contact Information

# Safer streets: Raised Pedestrian Crossings

blogTO

BEST OF TORONTO RESTAURANTS LATEST NEWS PLACES EVENTS VIDEOS PATIO GUIDE MORE



## Experts say raised crosswalks could prevent many pedestrian deaths in Toronto



<https://www.blogto.com/city/2022/01/experts-say-raised-crosswalks-could-prevent-many-pedestrian-deaths-toronto/>

# Safer streets: Leading Pedestrian Interval (i.e. Pedestrian Head Start Signal)



The Leading Pedestrian Interval (LPI), also known as Pedestrian Head Start Signal program provides an advanced walk signal so that pedestrians begin to cross the street before vehicles get a green signal. The purpose of LPI is to provide pedestrians an advantage over turning vehicles at intersections where it is determined that pedestrians, wishing to enter the crosswalk, were being hindered by aggressive right turns. The LPI is used to improve motorist yielding behaviour toward pedestrians in a crosswalk. The LPI is particularly helpful for older pedestrians, as they may take longer to occupy the crosswalk following the start of a "walk" indication, making them less obvious to turning motorists.

<https://www.toronto.ca/services-payments/streets-parking-transportation/traffic-management/traffic-signals-street-signs/types-of-traffic-signals/leading-pedestrian-interval-phase/>

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## Contact Information

## Safer streets: Traffic calming infrastructure / engineering improvements



<https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/safety-initiatives/reduced-crossing-distances/>

<https://www.tcat.ca/project/saferstreetsnearschools-getting-started/traditional-traffic-calming-measures/>

## Safer streets: Traffic calming infrastructure / engineering improvements e.g. Glen Road in Rosedale



Images: Google Maps

<https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/safety-initiatives/reduced-crossing-distances/>

<https://www.tcat.ca/project/saferstreetsnearschools-getting-started/traditional-traffic-calming-measures/>

# Reducing barriers to cycling: Building safe and comfortable infrastructure



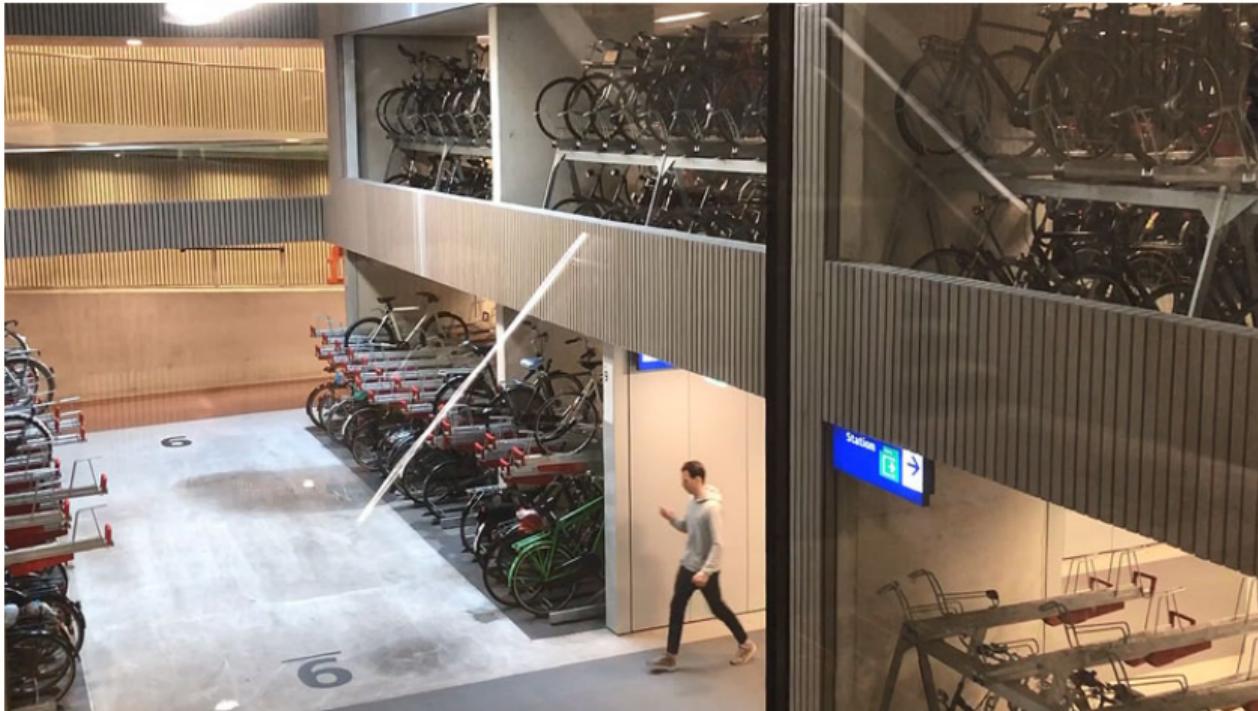
"The City of Vancouver has a vision to make cycling safe, convenient, comfortable and fun for all ages and abilities (AAA)"

# Induced demand, not just for cars!



<https://transformlab.shinyapps.io/CyclingInGTHA/>

## Reducing barriers to cycling: Available and safe bicycle parkring



<https://bicycledutch.wordpress.com/2019/08/20/finally-fully-open-utrechts-huge-bicycle-parking-garage/>

# Reducing barriers to cycling: Bike escalators in Norway



[https://www.boredpanda.com/bicycle-escalator-cyclocable-trondheim-norway/?utm\\_source=duckduckgo&utm\\_medium=referral&utm\\_campaign=organic](https://www.boredpanda.com/bicycle-escalator-cyclocable-trondheim-norway/?utm_source=duckduckgo&utm_medium=referral&utm_campaign=organic)

## Complete Streets:

"Complete Streets are streets that are safe for everyone: people who walk, bicycle, take transit, or drive, and people of all ages and abilities"

<https://www.tcat.ca/project/complete-streets/>



## Complete Streets:

e.g. YongeTOmorrow



<https://urbantoronto.ca/news/2021/01/downtown-yonge-makeover-finalized-heads-february-council-vote>

## re(redesigning) streets is difficult: Can be differing public opinions

e.g. this intersection was re-designed by local residents - then the city added temporary infrastructure - and then local residents voted to return to the original design

<https://www.cbc.ca/news/canada/toronto/dave-meslin-sidewalk-toronto-chalk-leaves-1.4427663>

<https://www.toronto.ca/wp-content/uploads/2019/07/8edc-Regal-Road-Consultation-Report-FINAL-AODA-July21.pdf>

### Using just chalk and leaves, Toronto residents re-imagine 'poorly designed,' 'dangerous' intersection



'Sometimes neighbours just have to come together with some chalk and some leaves and lead the way'

CBC News · Posted: Dec 01, 2017 12:23 PM ET | Last Updated: December 1, 2017



Above Is what the intersection Regal Road and Springmount Avenue looked like before the residents of Regal Heights redesigned it. Below is the result. (Dave Meslins/Twitter)

# re(redesigning) streets is difficult: Varying institutional interests

## Avenues or Arterials: The Struggle to Change Street Building Practices in Toronto, Canada

PAUL M. HESS

*Department of Geography and Planning, University of Toronto, Toronto, Ontario, Canada*

**ABSTRACT** This paper explores why Toronto's policies for improving pedestrian conditions are not better reflected in the design of arterial streets as the city tries to refashion them into pedestrian-oriented 'Avenues'. Professional frameworks shaping street design date from the first half of the 20th century and reflect a consensus between the fields of planning and engineering. Recently, this consensus has broken down in terms of the design of arterial streets. The role of engineering standards in this story has been told, but this study also examines how other institutionalized practices continue to operate making design changes difficult. Understanding why this occurs has lessons beyond Toronto and is intended to help cities to better match street-making practices to new visions of pedestrian-oriented streets.

## re(redesigning) streets is difficult:

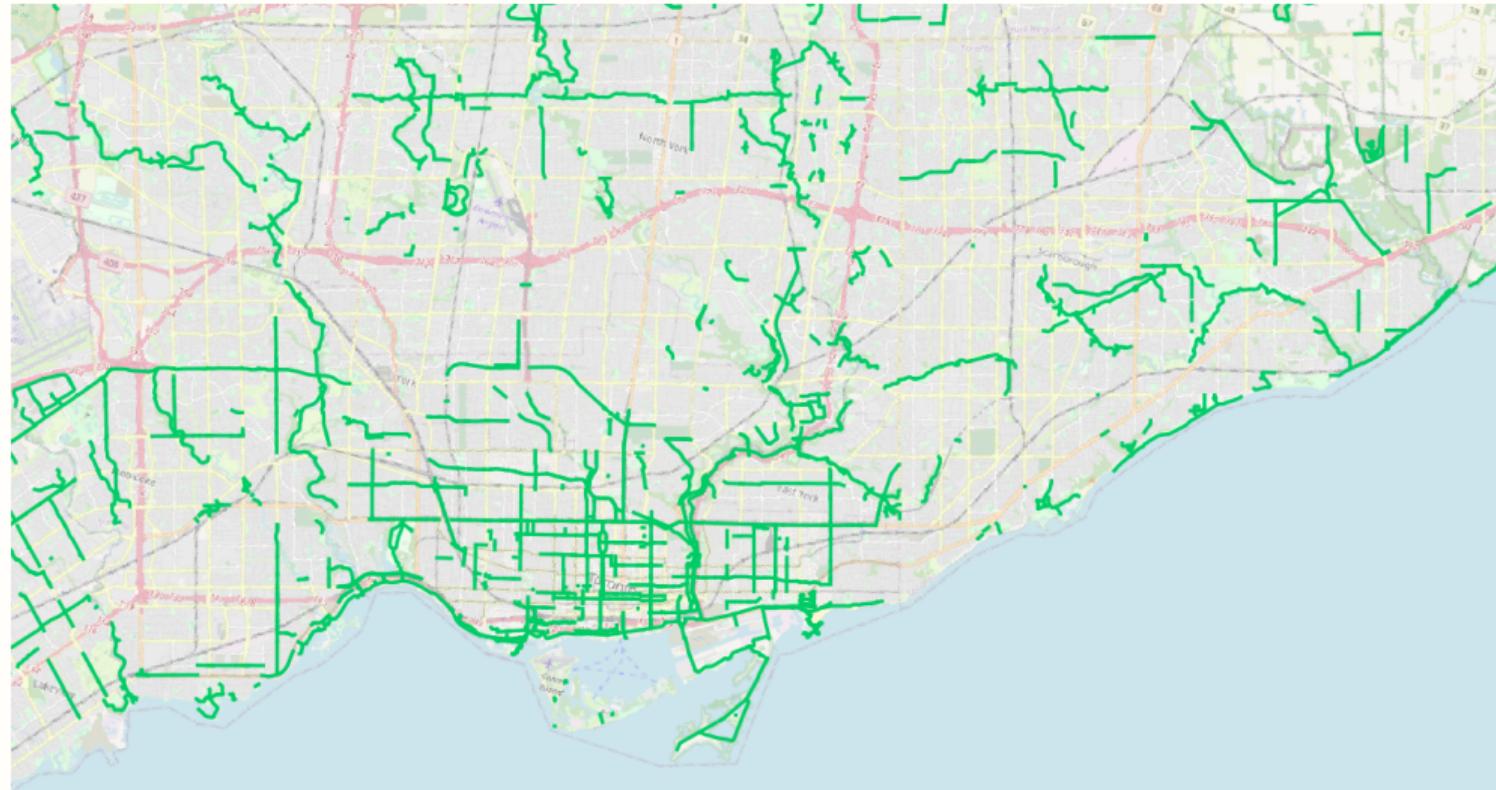
- ▶ Existing streets typically have a set ROW (Right of Way) width
- ▶ (re)design often involves trade-offs and competition for space
- ▶ e.g. competition between modes, as a place or for traffic flow, an avenue or an arterial, etc.



## Street Re-Design Activity

- ▶ Queen Street West (Dufferin to Yonge) - 20m ROW
- ▶ University Ave (Queen to College) - 55m ROW
- ▶ Dufferin St South (Queen to Bloor) - 20m ROW
- ▶ Jane St North (Eglinton to Sheppard) - 27m ROW
- ▶ Lawrence East (Victoria Park to Kingston) - 36m ROW
  
- ▶ Use Google Streetview to briefly explore and describe current use (number of lanes, transit routes, bike lanes if they exist, etc.)
- ▶ Use Streetmix to re-design the street to make it more "complete"

## Reducing barriers to active travel: Improving Network Connectivity



From <https://www.openstreetmap.org>

# Reducing barriers to active travel: Improving Network Connectivity

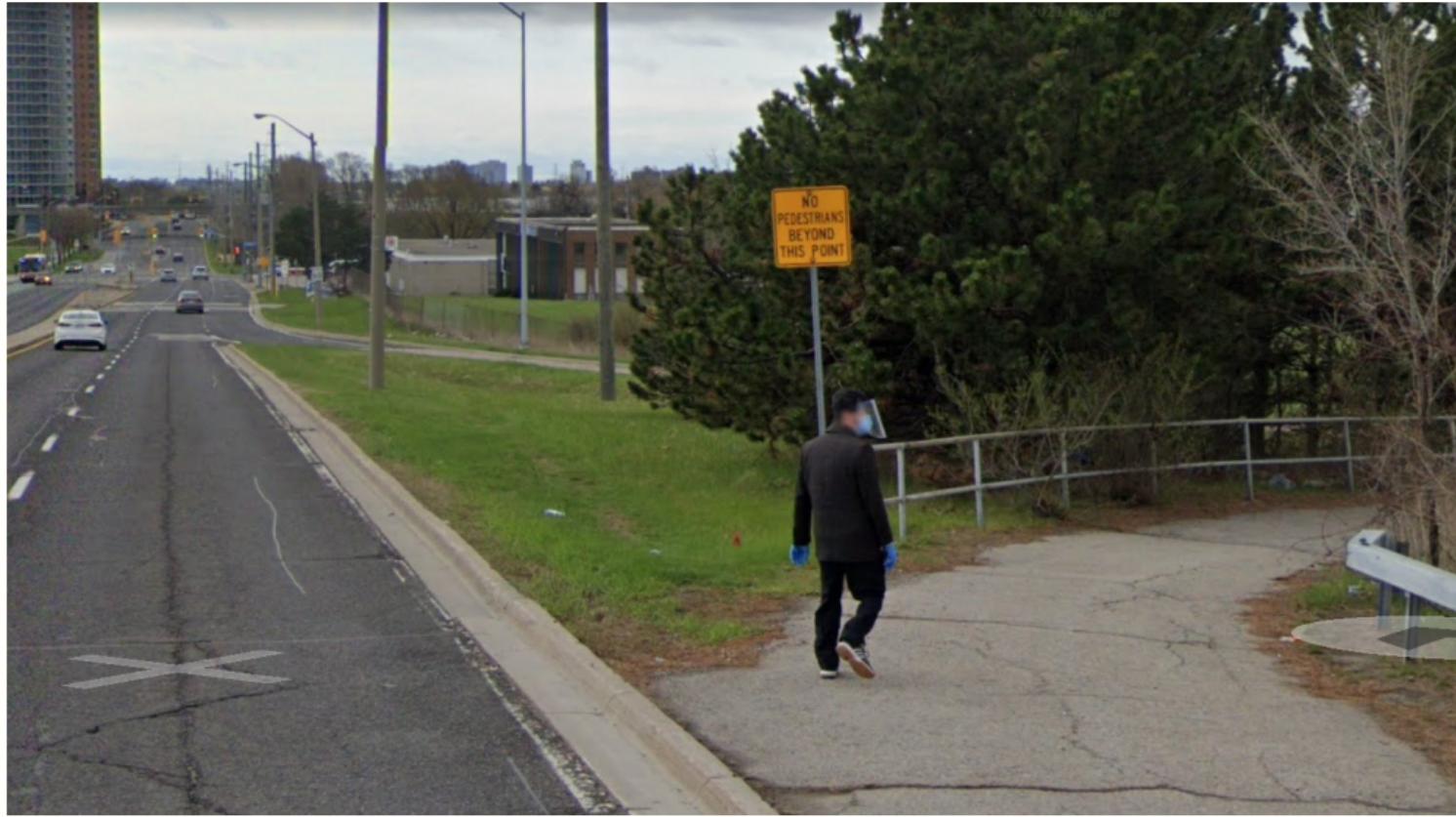
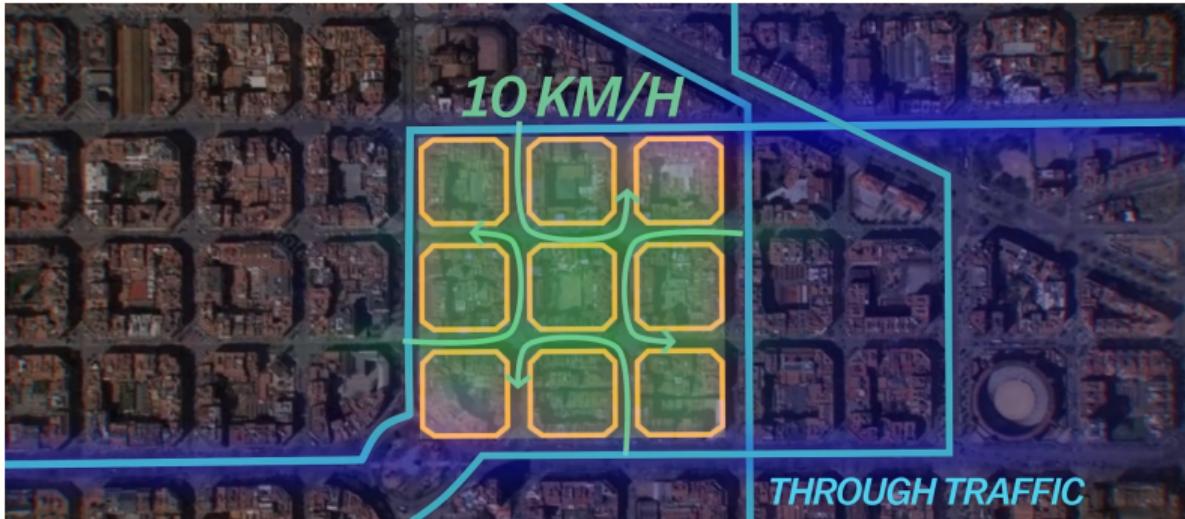


Image from Google Streetview <https://www.google.ca/maps/@43.7786041,-79.2645439,19z>

**Reducing barriers to active travel:**  
Blocking auto travel, but allowing  
bikes and pedestrians to travel  
through



## Reducing barriers to active travel: Super Blocks



<https://www.archdaily.com/796252/how-barcelonas-superblocks-pedestrian-plan-hopes-to-return-the-streets-to-the-people>

## Reducing barriers to active travel: Land-use and destination accessibility

e.g. there is a network of paths, but many destinations are really far away



## **Next Week**

### Public Transit

- ▶ Theory and practice of public transportation planning, design, and operations.
- ▶ Overview of Transit Oriented Development (TOD)