Linking population-based data to study effects of the built environment on health

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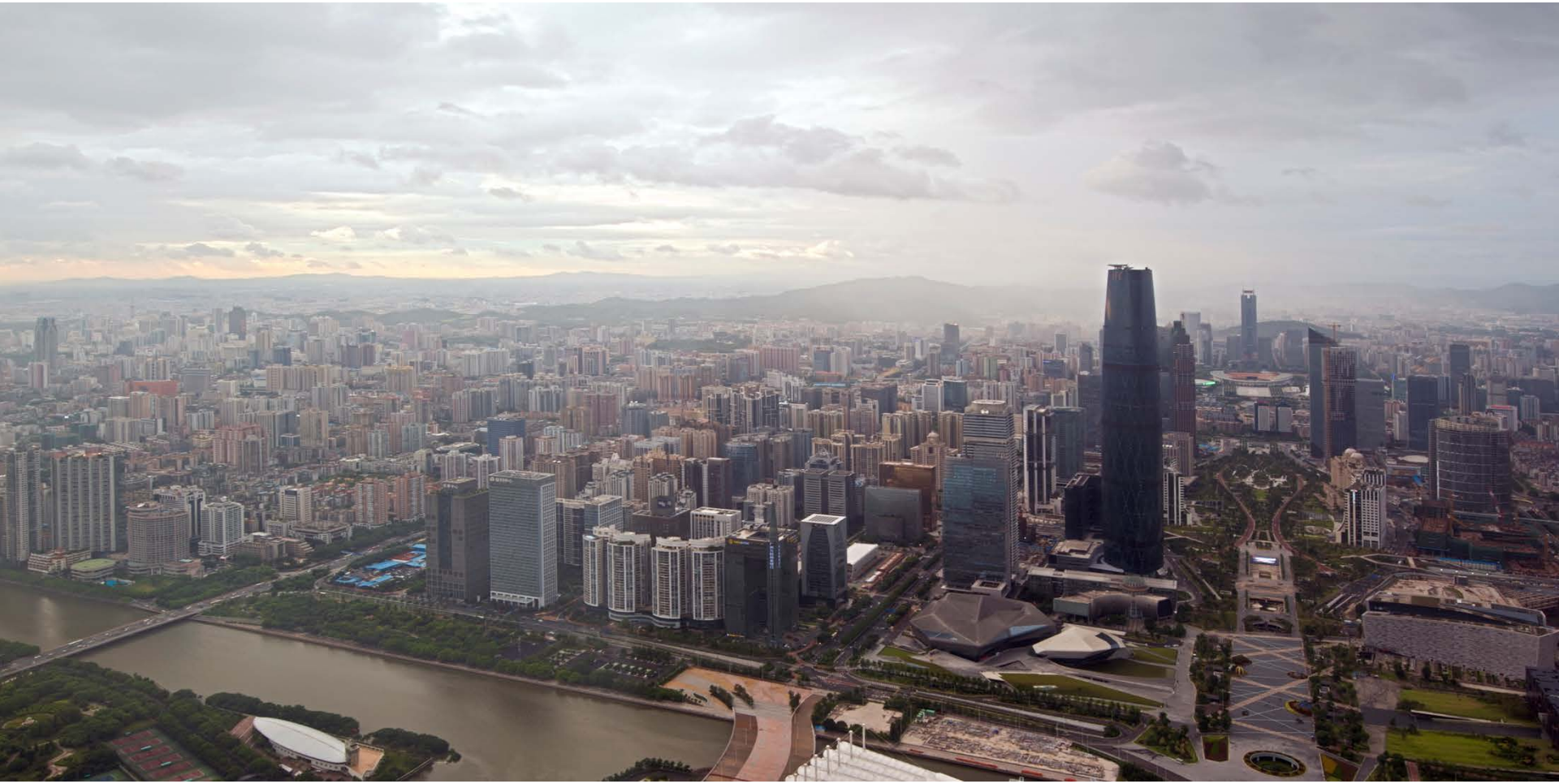


Trends in urban design ⇨ car-oriented communities

Compact Communities

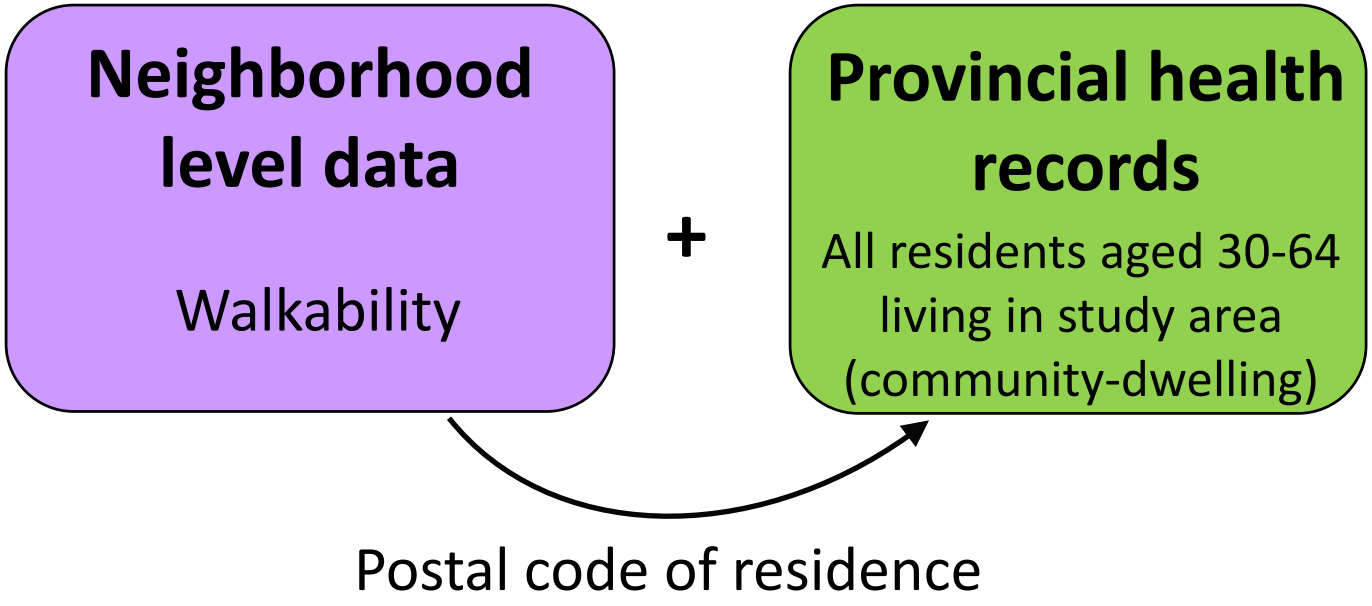
Vs.

Urban sprawl

Greater reliance on automobiles


Are walkable neighborhoods experiencing a slower rise in obesity and diabetes?

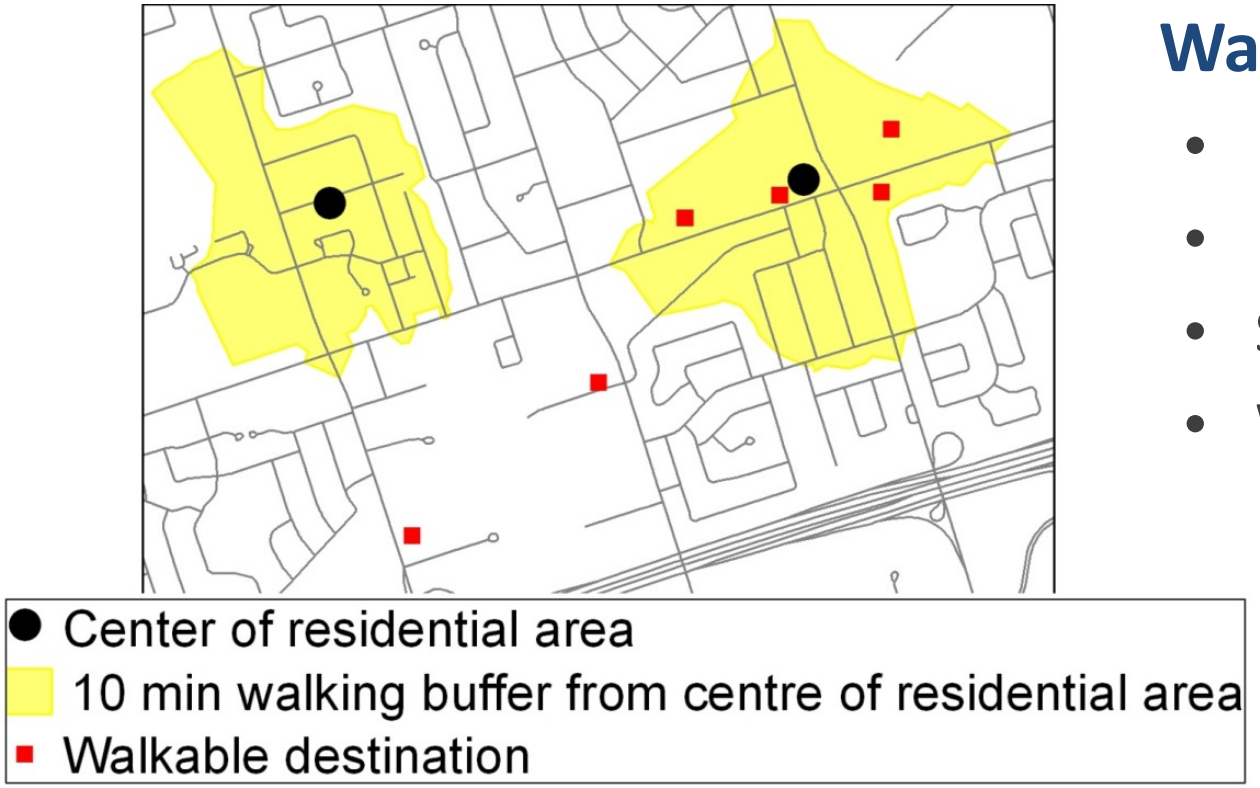
Overview of methods



Study area

- Includes **15 municipalities**, with a combined population **> 7 million people**
- Represents more than one-fifth of the Canadian population

Neighborhood exposures



Walkability Index:

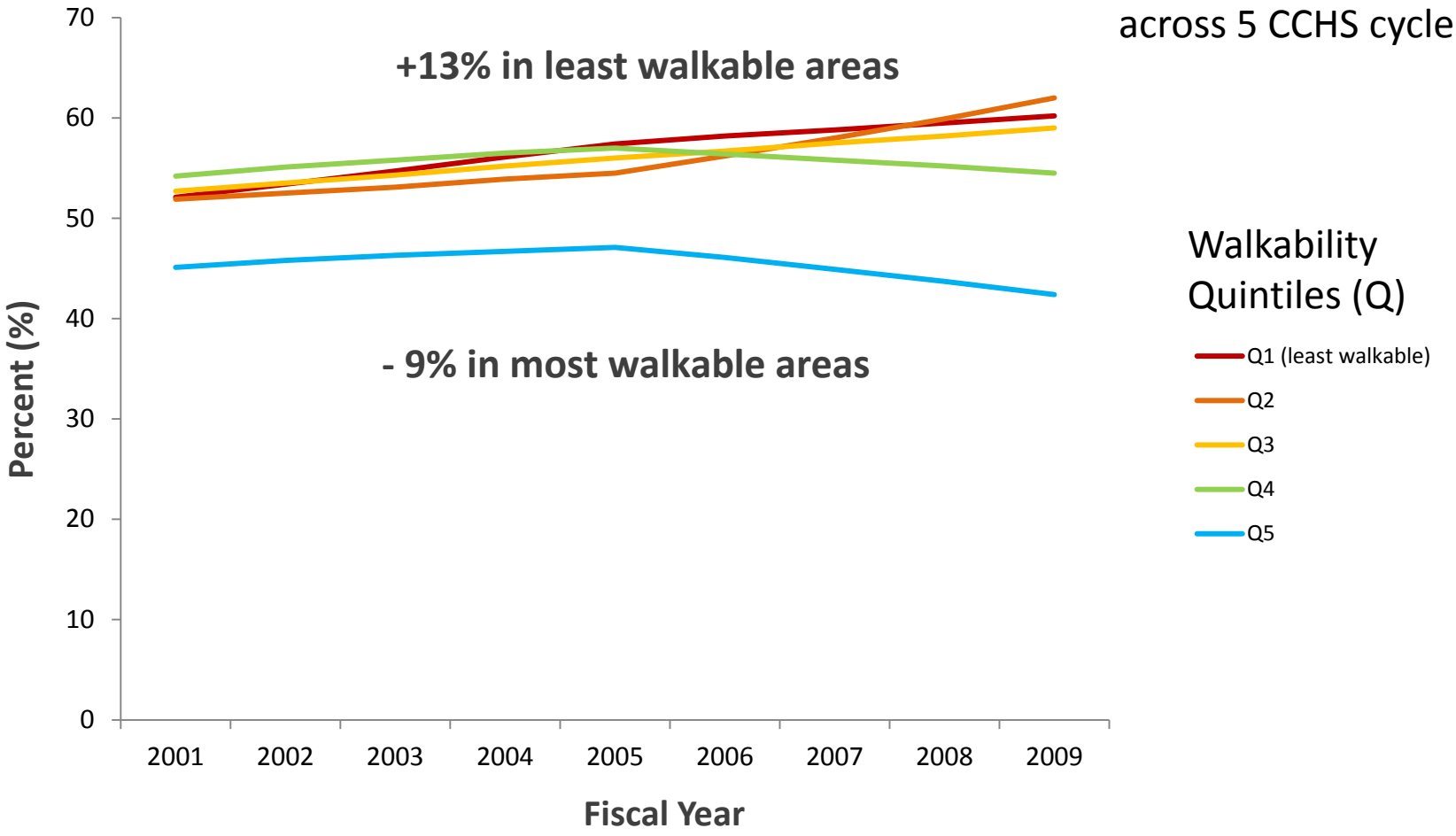
- Population density
- Residential density
- Street connectivity
- Walkable destinations

Glazier, Creatore, Weyman, Fazli, Matheson, Gozdyra, Moineddin, Shriqui VK, Booth GL. PLoS one 2014

Results

Age-/sex-adjusted prevalence of overweight or obesity* by walkability quintile (Q)

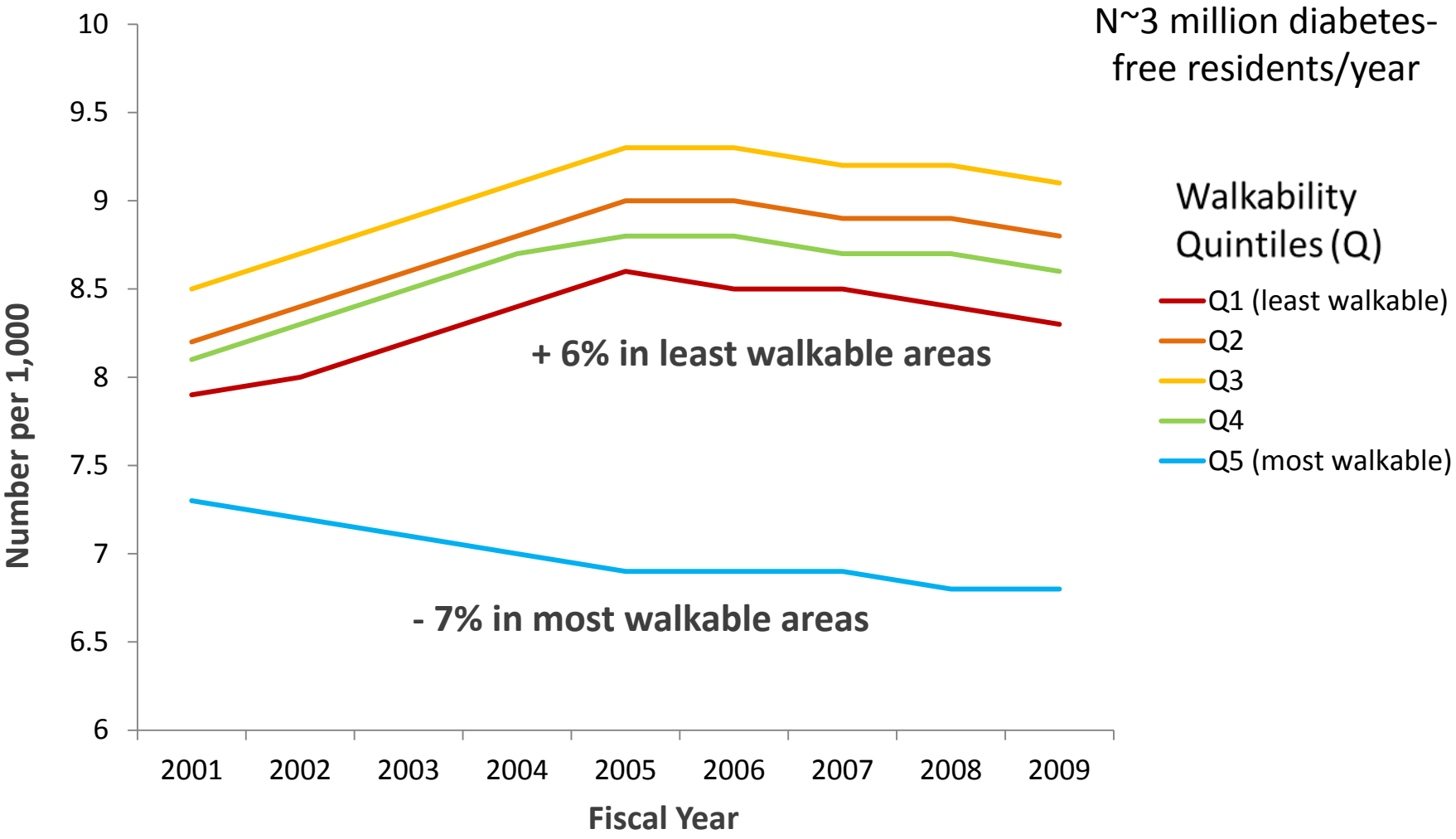
N~50,000 participants across 5 CCHS cycles



Data Source: Canadian Community Health Survey

*adjusted for age, sex and based on ethnic-specific BMI thresholds; aged 30-64

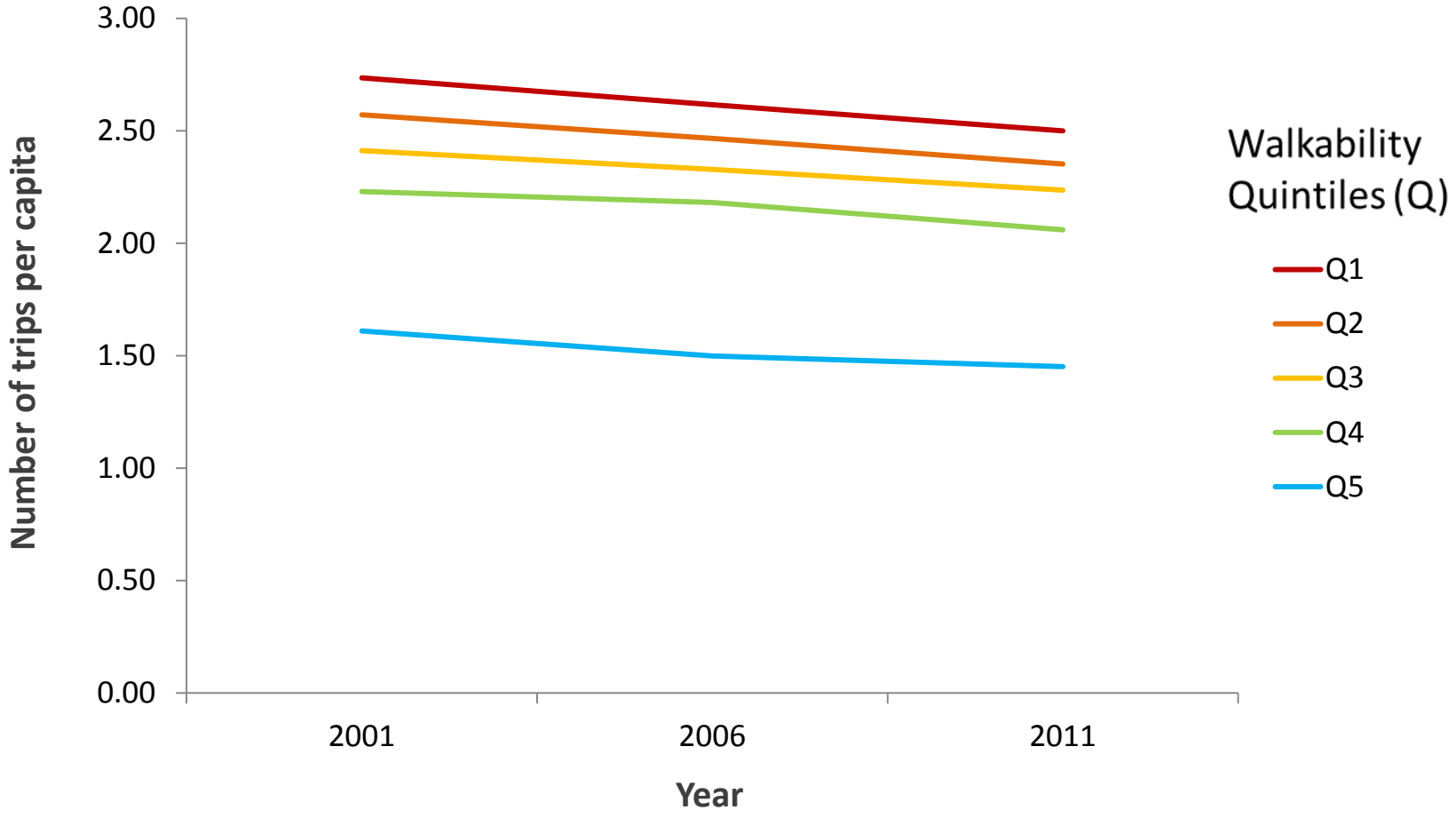
Adjusted diabetes incidence* by walkability quintile (Q)



Data Source: Ontario Diabetes Database, Registered Persons Database
*adjusted for age, sex, income, ethnicity; aged 30-64

Mode of transportation:*

Number of car trips per person per day by walkability quintile (Q)

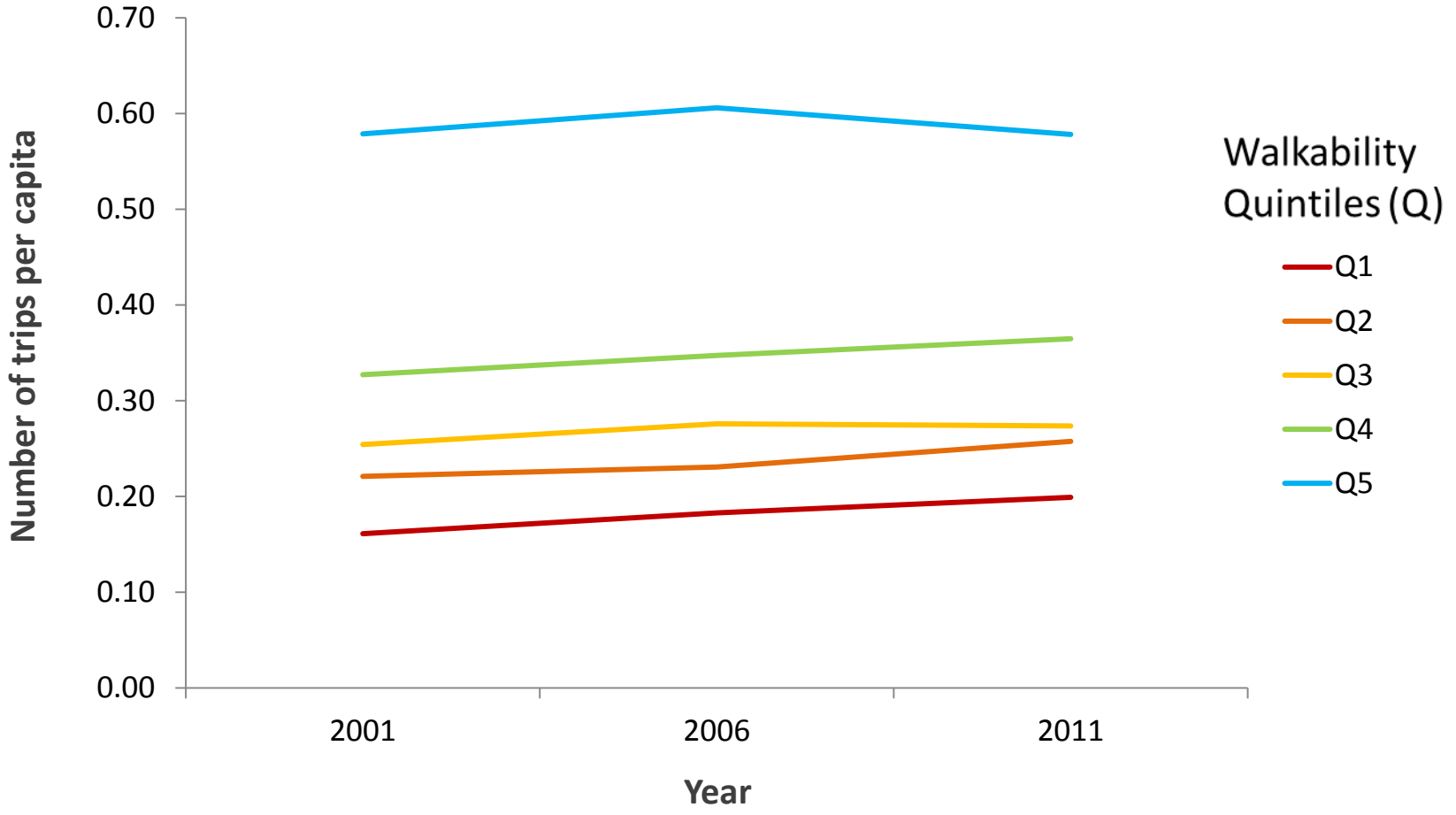


Data Source: Transportation Tomorrow Survey

*mode of transportation to work or school; aged 30-64

Mode of transportation:*

Number of public transit trips per person per day by walkability quintile (Q)

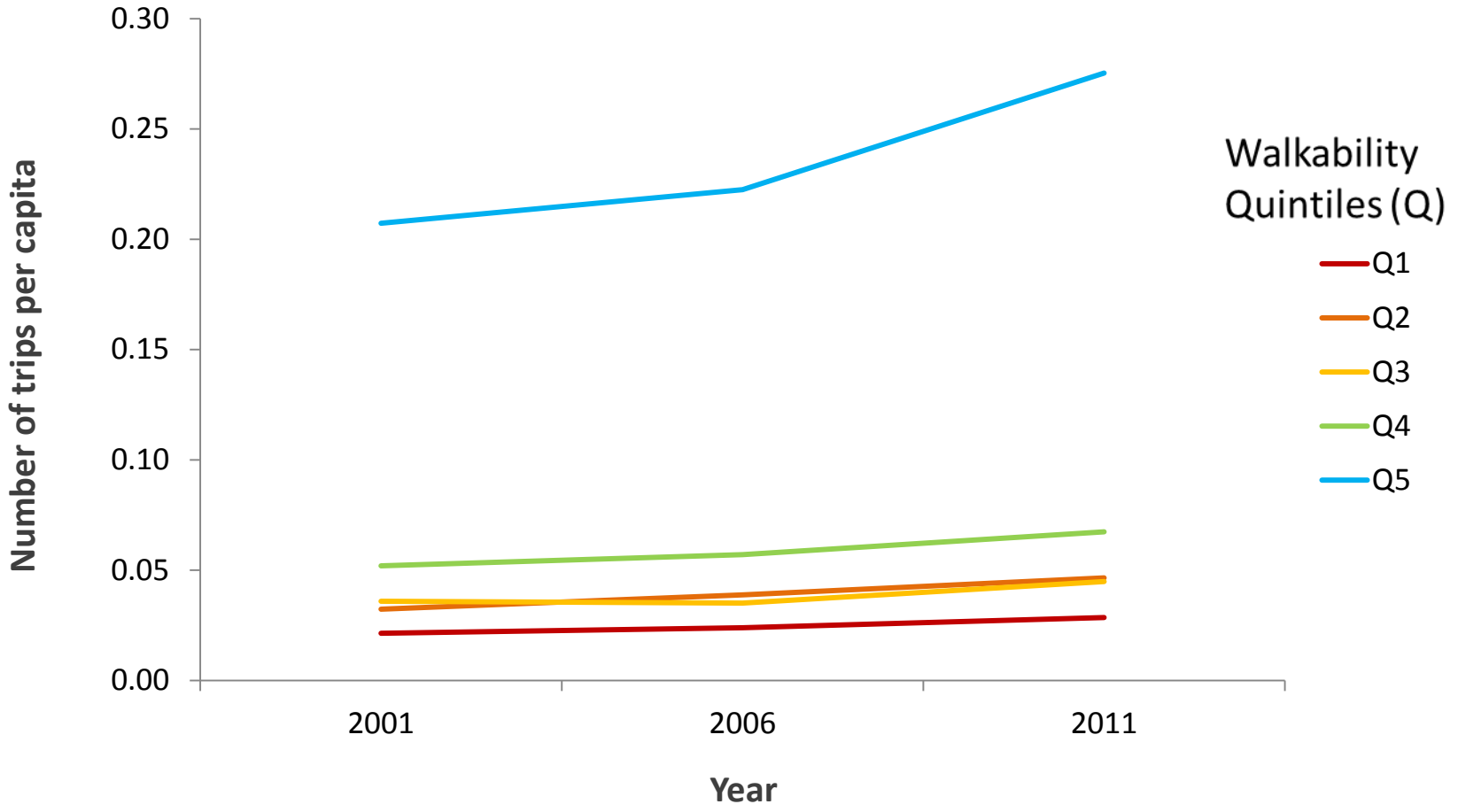


Data Source: Transportation Tomorrow Survey

*mode of transportation to work or school; aged 30-64

Mode of transportation:*

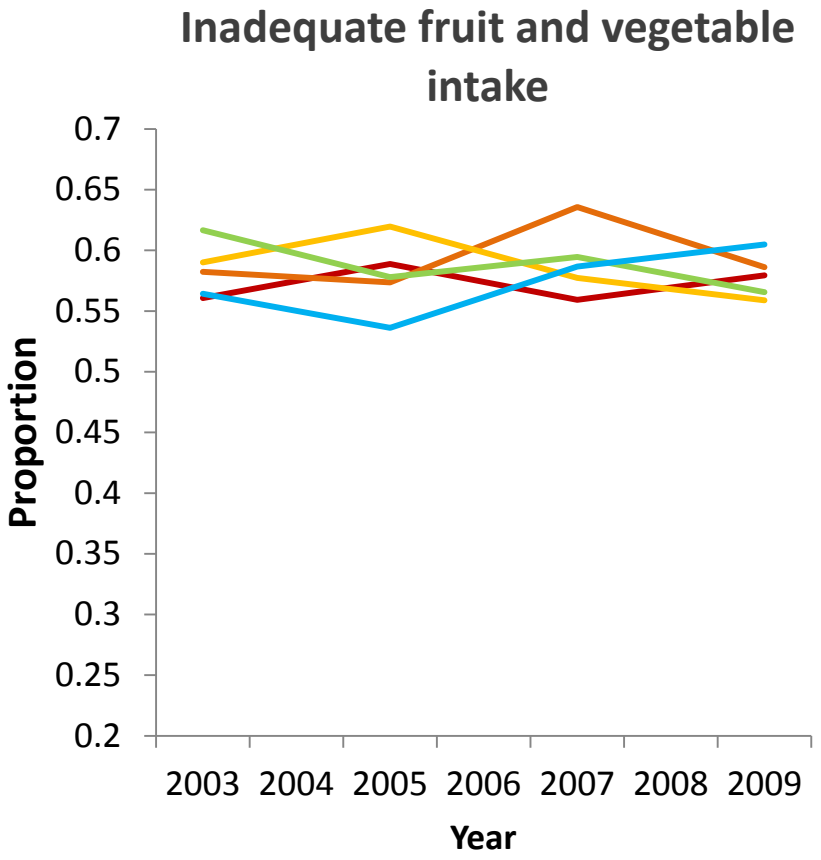
Number of walking/cycling trips per person per day by walkability quintile (Q)

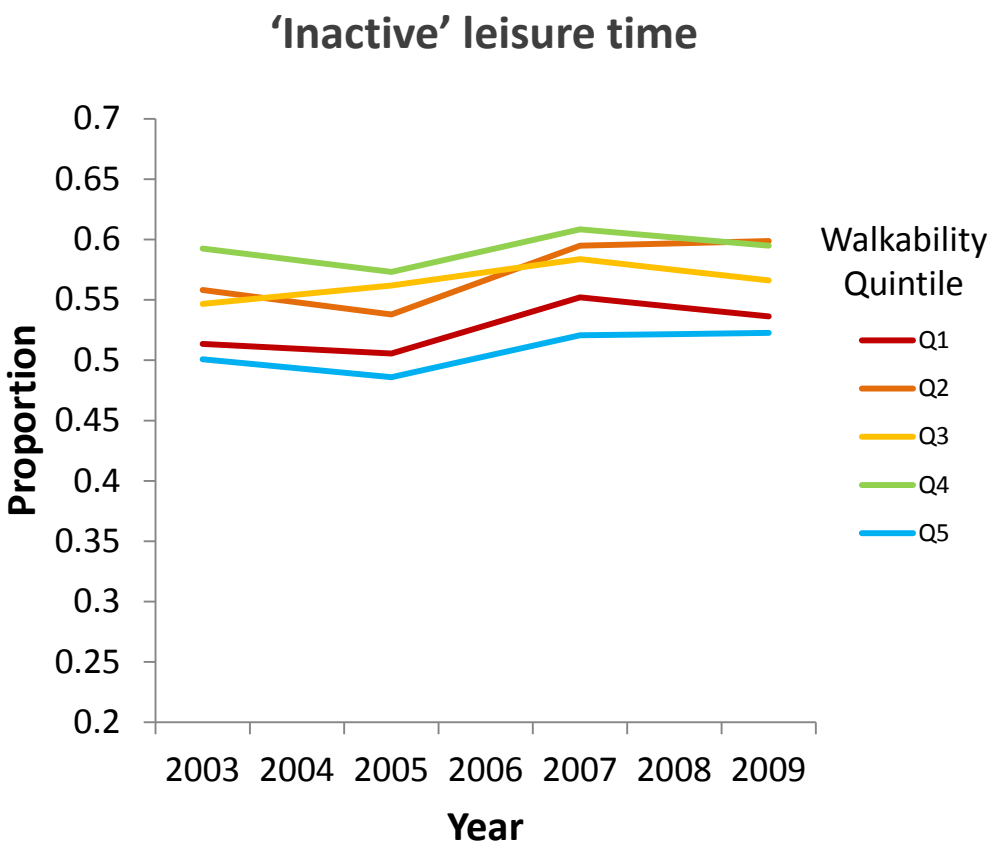


Data Source: Transportation Tomorrow Survey

*mode of transportation to work or school; aged 30-64

Other lifestyle characteristics*
by walkability quintile (Q)





Data Source: Canadian Community Health Survey
*adjusted for age and sex; aged 30-64


Are individuals living in more walkable areas at lower risk of developing diabetes?

Creation of study cohort

Provincial health databases

Lowest walkability quintile = 491,610

Highest walkability quintile = 466,957

using postal code on April 1, 2002

Excluding
- prior diagnosis of diabetes
- living in long-term care facilities or other institutions

March 31, 2012

for the development of diabetes
(Ontario Diabetes Database)

Inverse Probability Treatment Weighting (IPTW) to create balanced groups

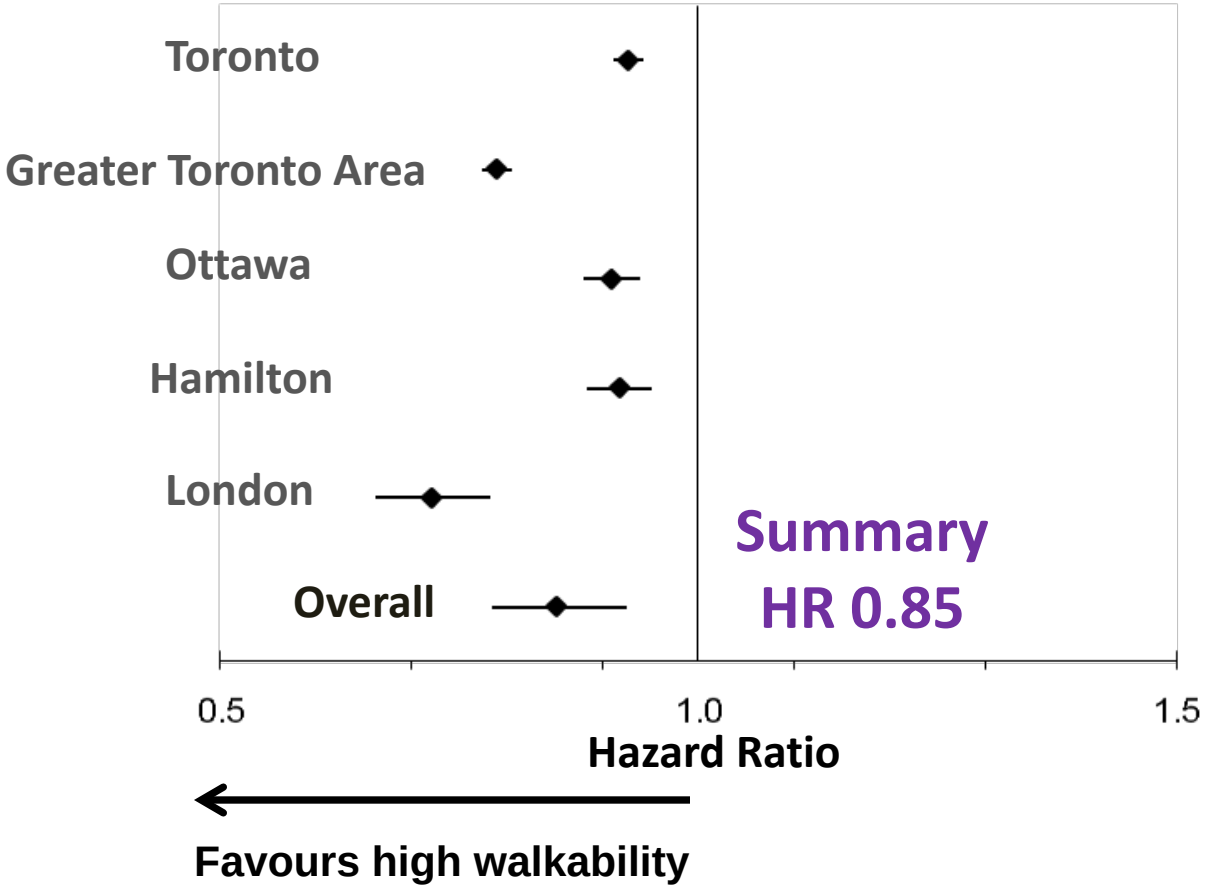
- propensity scores reflecting the likelihood of living in the highest vs. lowest walkability area
- weights were assigned to each individual based on their propensity score
- 5 region-specific Cox P.H. models
  - Toronto
  - Greater Toronto Area
  - Ottawa
  - Hamilton
  - London
- Random effects to generate summary HRs

Baseline characteristics after IPTW weights

Characteristic	Low walkability	High walkability	Standardized differences
Mean age	48.4	48.6	0.009
% Males	48.5	48.6	0.003
% Recent immigrants	7.1	6.3	0.03
% South Asian	5.4	5.6	0.01
% Other visible minority	20.1	19.2	0.03
% Highest deprivation quintile	15.7	12.6	0.09
Mean no. primary care visits/year	4.66	4.64	0.003
% Unstable chronic disease	24.8	24.7	0.001
% Myocardial infarction	0.7	0.7	0.001

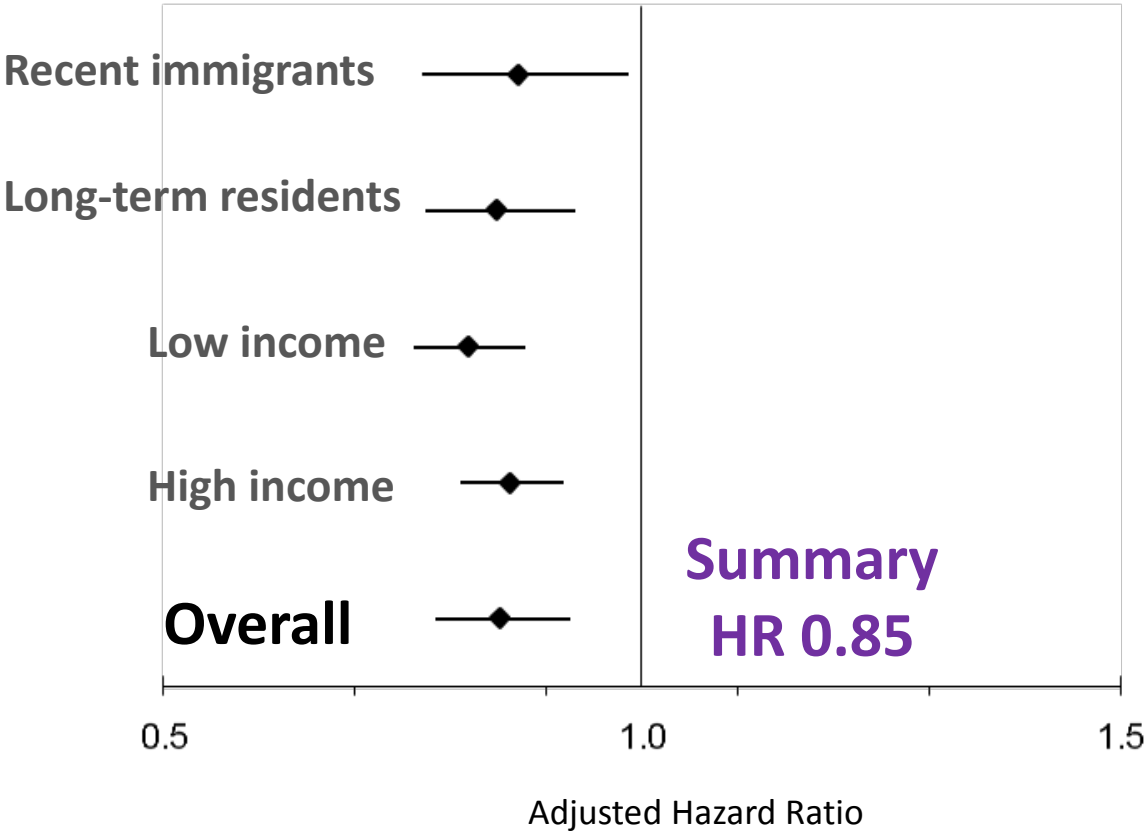
Standardized difference < 0.1 = well balanced groups

Diabetes incidence in highest vs. lowest walkability quintile among individuals **age 30-64 yrs**



Based on weights from IPTW; * includes age, sex, income, % visible minority, % South Asians baseline comorbidity, hypertension, cardiovascular disease (MI, stroke)

Diabetes incidence in highest vs. lowest walkability quintile, all analyses, **aged 30-64**



Conclusions

- High neighborhood walkability appears to be protective for the development of diabetes in young and middle-aged urban populations

- Changes in zoning, urban planning, and design that promote walking and other forms of active transportation may help to curb the ongoing rise in obesity and diabetes.

- Further research is needed to understand the full impact that such interventions will have.

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