Prevalence and correlates of active transportation among adults: the 2007-2011 Canadian Health Measures Surveys

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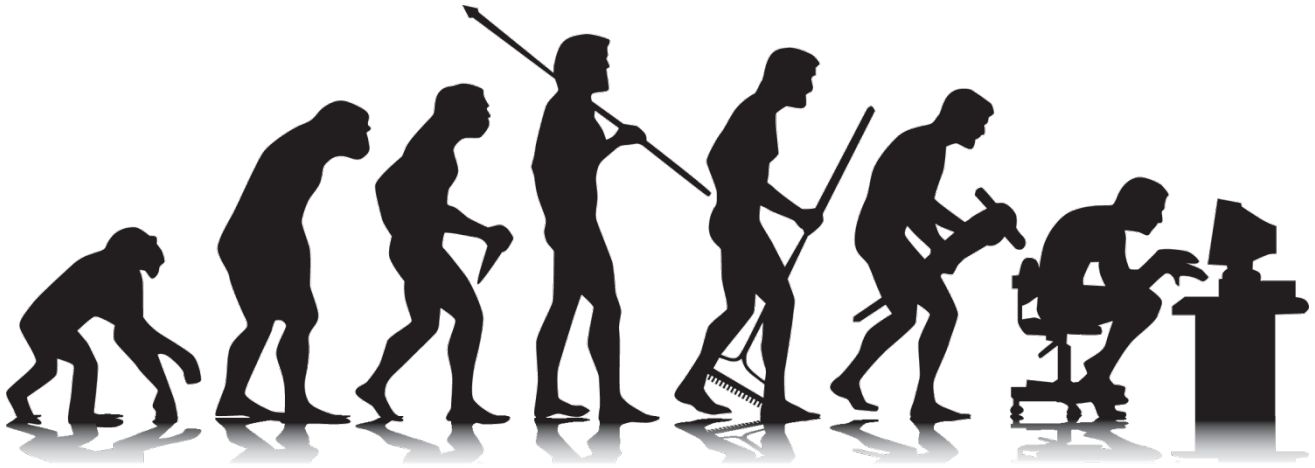
CHEO

Introduction

- Only 15% of Canadian adults aged 20-69 years meet the Canadian physical activity (PA) guidelines [Statistics Canada, 2013].
- Adults spend ~10 hours/day engaging in sedentary behaviours (i.e. sitting, TV, car travel, etc).
- Physical inactivity is one of the most important predictors of morbidity from non-communicable diseases and all-cause mortality [Lee et al., 2012].



Active transportation (AT)

- Active travelers report higher PA and tend to have lower body weight [Wanner et al., 2012].
- Meta-analysis: AT is associated with reduced cardiovascular risk [Hamer & Chida, 2008].
- AT may also reduce pollution and greenhouse gases emissions [Larouche, 2012].
- Only ≈ 6.6% of Canadian adults walk to/from work and 1.3% cycle [Canadian Census, 2006].

Research gaps

- Most AT studies have focused solely on the trip to/from work:
  - Active trips to/from other destinations have been understudied (i.e. to parks, shops, sport fields, school, etc.);
  - These destinations may provide alternative ways to engage in AT if the home-work distance is too long;
  - We know very little about the correlates of AT to/from these destinations.
- Due to small sample sizes and/or few cyclists, walking and cycling have been combined in analyses.
  - However, their correlates may differ!

Objectives

- 1. Assess the prevalence of utilitarian walking and cycling in a large nationally-representative sample of Canadian adults (20-79 year olds) who participated in the 2007-2011 Canadian Health Measures Survey (equivalent of NHANES).
- 2. Investigate the association between socio-demographic variables (age, gender, education, income, and occupational PA) and measures of utilitarian walking and cycling.

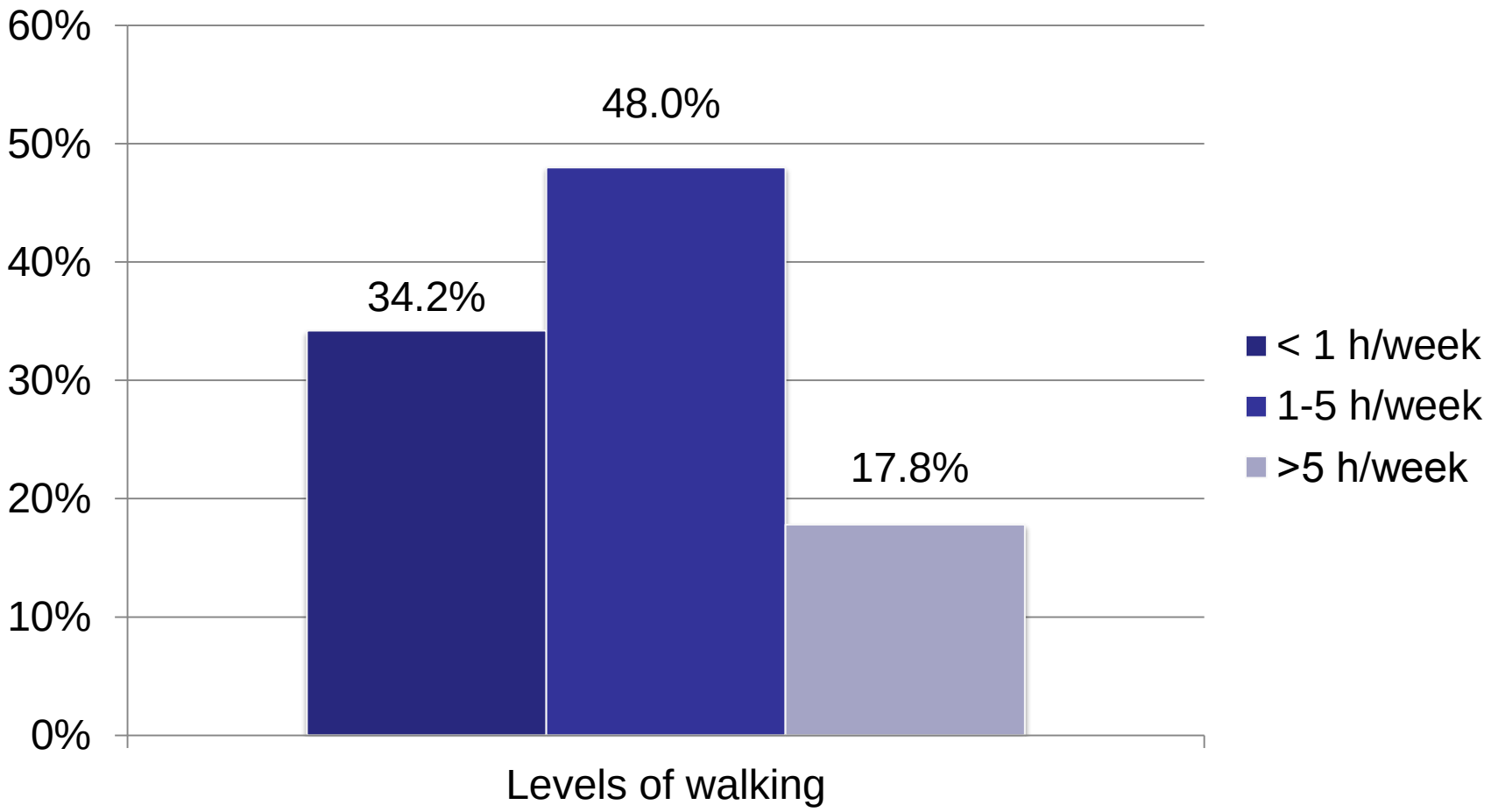
Methods

- **<u>Participants</u>**: 7,160 adults aged 20-79 years (50.5% female) in 33 sites across Canada.
- **<u>Active transportation</u>**: participants were asked "*in a typical week in the past 3 months, how many hours did you usually spend walking [or bicycling]* ***to work or to school or while doing errands****?*";
- Response options categorized as 3 levels of walking (<1h/wk, 1-5h/wk, >5h/wk) and cycling (no cycling, <1h/wk, ≥1h/wk) based on observed distributions.
- As part of a broader study, we examined the association between levels of walking/cycling and health indicators.

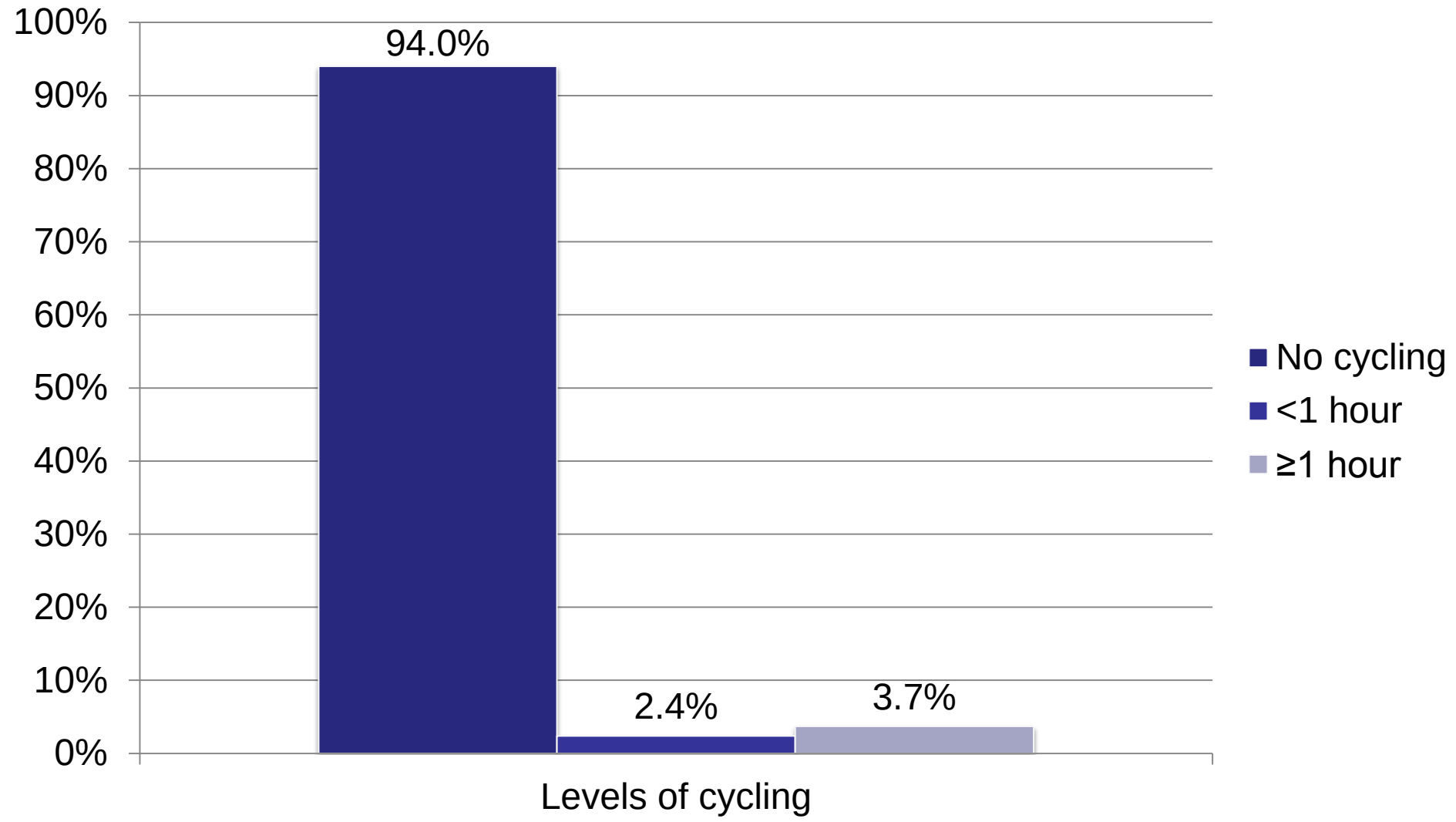
Data treatment and analyses

- Analyses performed with Stata using survey weights (for the combination of Cycle 1 and 2 of the CHMS) and bootstrap weights to account for the complex survey design.
- Multinomial logistic regression analyses examined the odds of walking and cycling according to the following socio-demographic variables:
  - Gender,
  - Age group (20-39; 40-59; 60-79 years)
  - Education (less than college; college; university)
  - Household income (less than $40,000; $40,000-$79,999; $80,000 or more)
  - Participants' usual daily PA level [e.g., "usually sit" vs. others (stand or walk quite a lot; do heavy work or carry very heavy loads)].

Prevalence of walking



Prevalence of cycling



Correlates of walking
(unadjusted models)

Independent variable	< 1 hour	1-5 hour OR ± 95% CI	p	> 5 hours OR ± 95% CI	p
Gender (men is reference)	Reference	**1.62 (1.33-1.98)**	**.038**	**1.87 (1.56-2.25)**	**<.001**
Age (20-39)		Reference			
Age (40-59)	Reference	**0.67 (0.55-0.83)**	**.001**	**0.65 (0.51-0.81)**	**.001**
Age (60-79)	Reference	**0.68 (0.58-0.80)**	**<.001**	**0.61 (0.46-0.83)**	**<.001**
Education (<college)		Reference			
Education (college)	Reference	1.29 (0.98-1.69)	.064	1.19 (0.91-1.55)	.196
Education (university)	Reference	**1.53 (1.13-2.07)**	**.007**	1.03 (0.77-1.38)	.826
Income (< $40,000)		Reference			
Income ($40,000-79,999)	Reference	1.00 (0.77-1.29)	.985	**0.69 (0.51-0.91)**	**.012**
Income (>$79,999)	Reference	1.17 (0.95-1.45)	.133	0.75 (0.54-1.03)	.071
Usual PA (low is reference)	Reference	1.03 (0.84-1.26)	.768	**2.00 (1.47-2.72)**	**<.001**

Correlates of walking
(adjusted model)

Independent variable	< 1 hour	1-5 hour OR ± 95% CI	p	> 5 hours OR ± 95% CI	p
Gender (men is reference)	Reference	**1.63 (1.35-1.97)**	**<.001**	**1.77 (1.46-2.23)**	**<.001**
Age (20-39)	Reference				
Age (40-59)	Reference	**0.67 (0.54-0.84)**	**.001**	**0.64 (0.49-0.82)**	**.001**
Age (60-79)	Reference	**0.76 (0.64-0.91)**	**.004**	**0.57 (0.42-0.77)**	**<.001**
Education (<college)	Reference				
Education (college)	Reference	1.18 (0.90-1.56)	.217	1.13 (0.88-1.47)	.325
Education (university)	Reference	**1.52 (1.12-2.06)**	**.010**	1.18 (0.86-1.62)	.303
Income (< $40,000)	Reference				
Income ($40,000-79,999)	Reference	0.93 (0.71-1.22)	.603	**0.64 (0.46-0.88)**	**.009**
Income (>$79,999)	Reference	1.11 (0.89-1.38)	.133	0.77 (0.55-1.06)	.103
Usual PA (low is reference)	Reference	1.10 (0.90-1.34)	.335	**2.12 (1.55-2.88)**	**<.001**

Correlates of cycling
(unadjusted models)

Independent variable	No cycling	< 1 hour OR ± 95% CI	p	≥ 1 hours OR ± 95% CI	p
Gender (men is reference)	Reference	**0.48 (0.23-1.00)**	**.005**	**0.38 (0.25-0.59)**	**<.001**
Age (20-39)	Reference				
Age (40-59)	Reference	0.62 (0.38-1.02)	.059	**0.61 (0.44-0.84)**	**.001**
Age (60-79)	Reference	**0.40 (0.24-0.66)**	**<.001**	**0.28 (0.17-0.46)**	**<.001**
Education (<college)	Reference				
Education (college)	Reference	0.66 (0.31-1.43)	.227	0.71 (0.29-1.71)	.427
Education (university)	Reference	1.27 (0.68-2.37)	.431	1.48 (0.90-2.41)	.114
Income (< $40,000)	Reference				
Income ($40,000-79,999)	Reference	1.23 (0.83-1.81)	.293	0.88 (0.56-1.39)	.565
Income (>$79,999)	Reference	1.30 (0.80-2.10)	.270	1.03 (0.59-1.79)	.927
Usual PA (low is reference)	Reference	1.09 (0.65-1.84)	.732	0.98 (0.59-1.63)	.949

Correlates of cycling
(adjusted models)

Independent variable	No cycling	< 1 hour OR ± 95% CI	p	≥ 1 hours OR ± 95% CI	p
Gender (men is reference)	Reference	0.48 (0.23-1.01)	.052	**0.39 (0.25-0.60)**	**<.001**
Age (20-39)	Reference				
Age (40-59)	Reference	0.62 (0.38-1.02)	.060	**0.61 (0.44-0.84)**	**.004**
Age (60-79)	Reference	**0.40 (0.24-0.67)**	**.001**	**0.28 (0.17-0.47)**	**<.001**

Women are more than twice less likely than men to cycle for transportation. Levels of cycling for transportation are particularly low for ≥ 60 year olds.

Discussion

- About half of participants reported walking 1-5 hours/week for utilitarian purposes.
- 15.2% of men and 20.2% of women reported > 5 hours/week.
- Only 8.4% of men and 3.7% of women reported any utilitarian cycling in the past 3 months.
  - In the 2003 Canadian Community Health Survey, 10.0% of men and 5.4% of women reported any cycling.
- No secular trend in levels of walking and cycling were evident across the two surveys.

Walking

- **After adjusting for other correlates**:
- Women were 63% more likely to report walking 1-5 h/wk and 77% more likely to report > 5 h/wk.
- Adults older than 39 years were substantially less likely to report walking at least 1 h/wk.
- University graduates were about 52% more likely to report walking 1-5 h/wk than adults without college education.
- Adults who earned $40,000 to $79,999 per year were less likely to report walking > 5 h/wk.
- Adults reporting greater usual daily physical activity were twice as likely to report walking > 5 h/wk.

2003 Canadian Community Health Survey

- Butler et al. (2007) examined the correlates of walking using similar questions among ≥ 15 years olds who participated in the 2003 Canadian Community Health Survey (N=127,610).
- In both men and women, reporting walking ≥ 6 hours/week was positively associated with:
  - Age ≤ 44 years
  - Being currently in school
  - Having a lower income
  - Being a smoker
  - Reporting a higher usual daily physical activity
- Men and women living in Québec reported less walking.
- Prevalence of walking was only marginally higher in women.

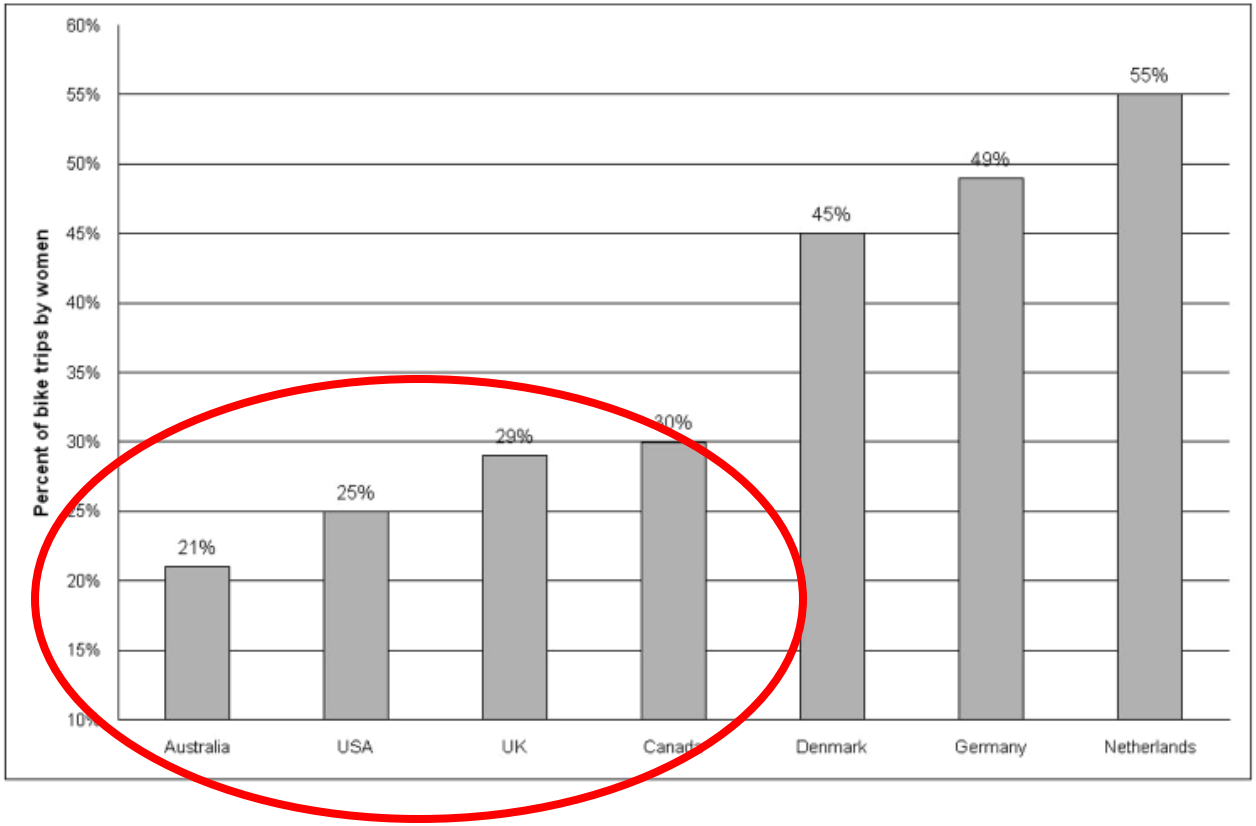
Cycling

- **After adjusting for other correlates:**
- Men were more than twice more likely to report cycling <1 h/week and almost 3 times as likely to report > 1 h/week.
- Older individuals reported lower levels of cycling.
- Cycling was not associated with participants' income, education and usual daily PA.
- There was a significant positive association between reported levels of walking and cycling (p=0.008).

2003 Canadian Community Health Survey

- In both men and women, reporting any cycling was positively associated with:
  - Age ≤ 44 years
  - Being currently in school
  - Being single
  - Having a lower income (particularly in men)
  - Reporting a higher usual daily physical activity
  - Self-reported leisure time physical activity
- Participants living in Atlantic provinces and immigrants reported less cycling.
- Prevalence of cycling was about twice as high in men.

% of bike trips made by women



Source: Pucher & Buehler. *Transport Reviews*. 2008;28(4):495-528.

Consistent with our results, women cycle much less than men in English speaking countries.

This is not so in the Netherlands, Denmark, and Germany where cycling is safer.

Women may be more risk-averse than men.

Photo: http://bikingtoronto.com/

Limitations and strengths

Limitations

- Cross-sectional design;
- Self-reported measures of walking and cycling.
  - Potentially cognitively challenging questions.
- Limited to 24 degrees of freedom;
  - Limited ability to examine geographic differences.
- CHMS was not designed to examine seasonality issues.

Strengths

- Large nationally-representative sample;
- Did not focus only on walking and cycling to/from work;
- Walking and cycling analyzed separately;
- Examined different levels of walking and cycling;
- Data collection throughout the year.

Conclusions

- Overall, our results indicate a high prevalence of walking (although at relatively low levels), but a very low prevalence of cycling.
- Both levels of walking and cycling were markedly lower among older participants, consistent with previously-reported age-related declines in PA.
- Lower prevalence of utilitarian cycling among women is also consistent with previous North American studies.
- Future longitudinal studies are warranted to examine:
  - Correlates of travel behaviour change
  - Effectiveness of AT interventions.

Acknowledgements

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Statistics Canada / Statistique Canada

Health Canada / Santé Canada

Public Health Agency of Canada / Agence de la santé publique du Canada

CIHR IRSC
Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

Questions?

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Blog (in French): http://cyclorevolution.blogspot.ca/

Supplementary material

Associations of levels of walking and cycling with objectively-measured PA

- Walking associated with MVPA in a linear manner.
  - Participants reporting ≥ 5 h/week accumulated an additional 9.3 min/day.
  - However, those reporting 1-5 h/week reported significantly less light PA (-17.6 min/day)
- Cycling was associated with higher MVPA, but the difference was only significant between those reporting > 1h/week vs. no cycling (+15.6 min/day)
- Neither walking nor cycling was associated with sedentary time.

Associations of levels of walking with health-related outcomes

- Participants reporting walking >5 hours/week had lower sum of skinfolds (-4.1 mm; p=0.010) than those reporting 1-5 hours.
- No other significant differences (all $p \geq 0.0167$)

Associations of levels of cycling with health-related outcomes

Variable	< 1 h/week vs. no cycling	≥ 1 h/week vs. no cycling	≥ 1 h/week vs. < 1 h/week
BMI (kg/m^2)	-0.1 (-1.5, 1.3)	**-1.9 (-2.6, -1.1)**	**-1.8 (-3.1, -0.4)**
Waist circumference (cm)	-0.4 (-4.2, 3.4)	**-6.0 (-8.2, -3.8)**	**-5.6 (-9.0, -2.2)**
Estimated VO_2max ($mL\ O_2 \cdot kg^{-1} \cdot min^{-1}$)	0.6 (-0.6, 1.8)	**3.3 (2.3, 4.4)**	**2.7 (1.2, 4.2)**
Total cholesterol/HDL (mmol/L)	-0.1 (-0.4, 0.2)	**-0.3 (-0.5, -0.1)**	-0.2 (-0.5, 0.2)
Glycohemoglobin (%)	**-0.1 (-0.2, 0.0)**	**-0.1 (-0.2, 0.0)**	0.0 (-0.1, 0.1)
C-reactive protein (nmol/L)	0.8 (-8.0, 9.5)	**-6.7 (-9.5, -3.8)**	-7.4 (-16.4, 1.5)
Triglycerides (mmol/L)	-0.2 (-0.4, 0.0)	**-0.3 (-0.5, -0.1)**	-0.1 (-0.4, 0.2)

Note: only variables for which a significant difference was found are shown for ease of interpretation.