

# Active Living Environments, walking, and Premature Cardiometabolic Mortality in a Large Canadian Cohort

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## Introduction

Studies have established links between active living environments, also widely known as 'walkable environments, with lower rates of obesity, hypertension and type 2 diabetes<sup>1-2</sup>. The extent to which these environments encourage active living is likely subject to life-course changes and sex differences. Few studies have assessed relationships between neighbourhood characteristics and cardiometabolic mortality, and most are ecological in nature<sup>3-5</sup>.

## Objective

To examine sex- and age-specific relationships between active living environments, walking and cardiometabolic mortality, by:

1. Assessing mean and distribution of average energy expenditure related to walking by ALE class.
2. Establishing association between walking and premature cardiometabolic mortality for this cohort.
3. Evaluating the overall relationship between active living environments and premature cardiometabolic mortality.

## Methods

- Canadian Community Health Survey respondents (2000-2010, N = 249,420) were linked with Canadian Mortality Database until 2011.
- We stratified analyses: older women (65-85 yrs), older men (65-81 yrs), middle age women (45-64 yrs), middle age men (45-64 yrs).
- We used open-source Canadian Active Living Environment Measure (Can-ALE)<sup>6</sup> derived for Canadian neighbourhoods, based on intersection density, points of interest, and dwelling density.
- Descriptive statistics and cox proportional hazards were used.
- Unique censoring endpoints for older men and older women corresponding to differences in life expectancy were chosen.

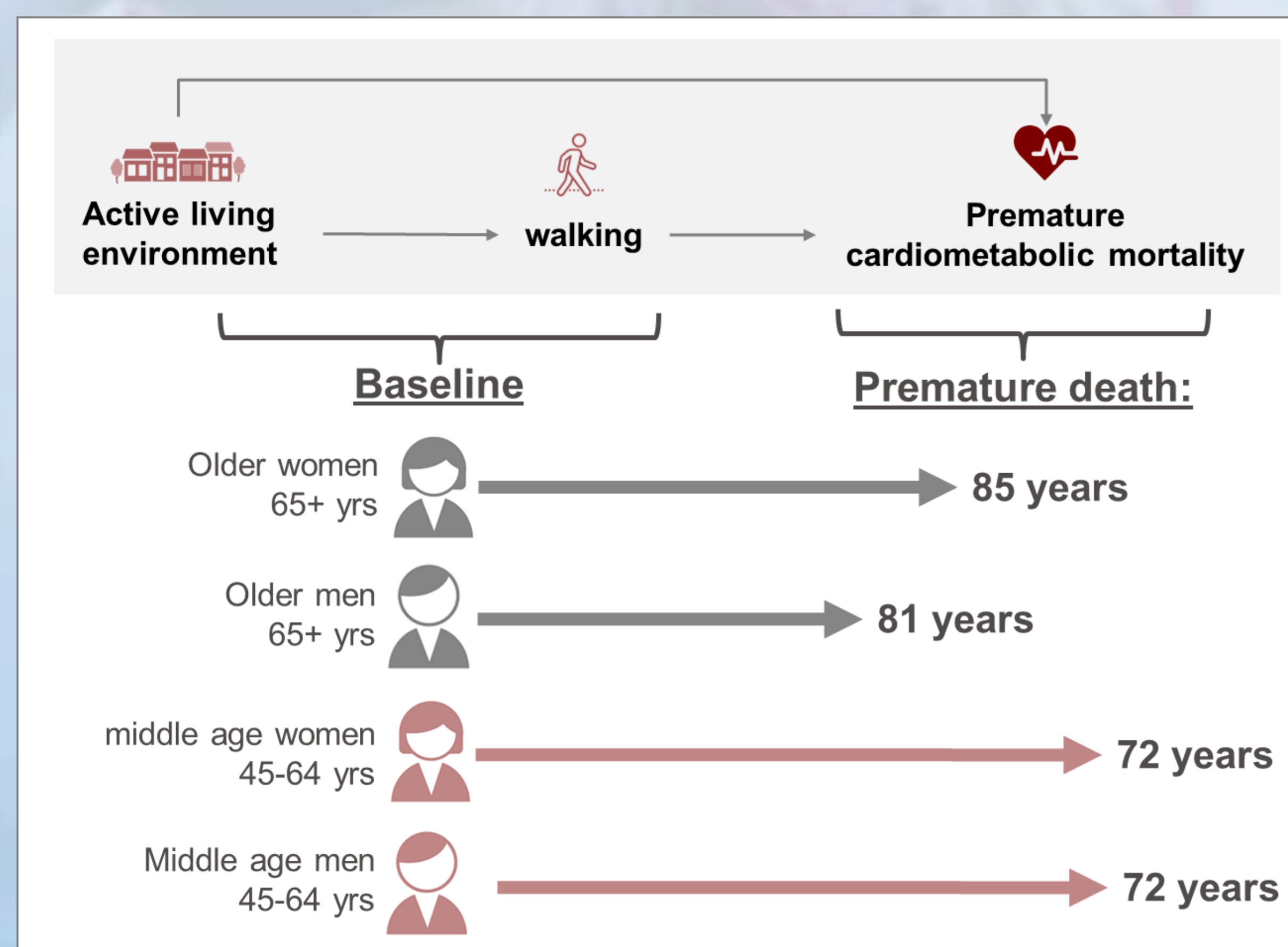


Figure 1. Analytic plan for investigating associations of the active living environment, walking, and mortality.

	Older women	Older men	Middle age women	Middle age men
N	55,860	35,470	84,465	73,625
% living in favourable ALE	7.0	6.1	6.1	6.3
Total follow-up time (person-years)	299,062	177,481	522,886	452,485
Median follow-up time (years)	4.81	4.47	6.39	6.35
Premature cardiometabolic deaths (%)	1750 (3.1)	1425 (4.0)	490 (0.6)	960 (1.3)

## Results 1: ALE and walking

Greater walking was observed in more favourable active living environments, regardless of sex and age group.

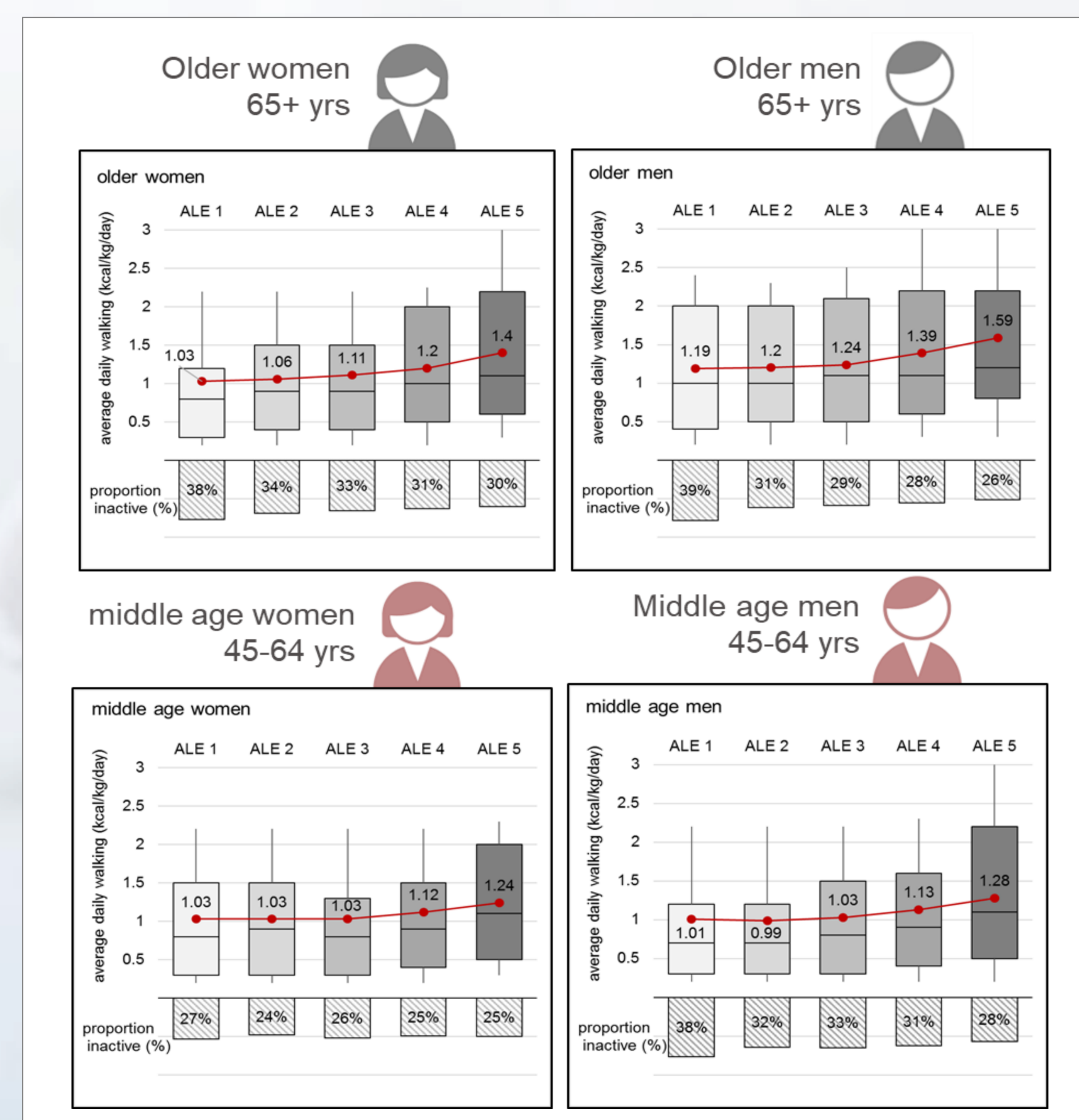


Figure 2. Boxplots of the distribution of the average daily energy expenditure for walking by active living environment favourability. ALE 1 and 5 represent the least and most favourable environments, respectively. Red markers and trend line denotes mean, and grey inverse histograms represent proportion that report no walking. Note that upper and lower limits of the box plots have been adjusted to represent the 90th and 10th percentile, respectively, for confidentiality purposes.

## References

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5. Hamidi et al. Associations between Urban Sprawl and Life Expectancy in the United States. *Int J Environ Res Public Health* 2018;15(5)
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## Results 2: Walking and mortality

Walking was associated with lower cardiometabolic death in all groups except for middle age men.

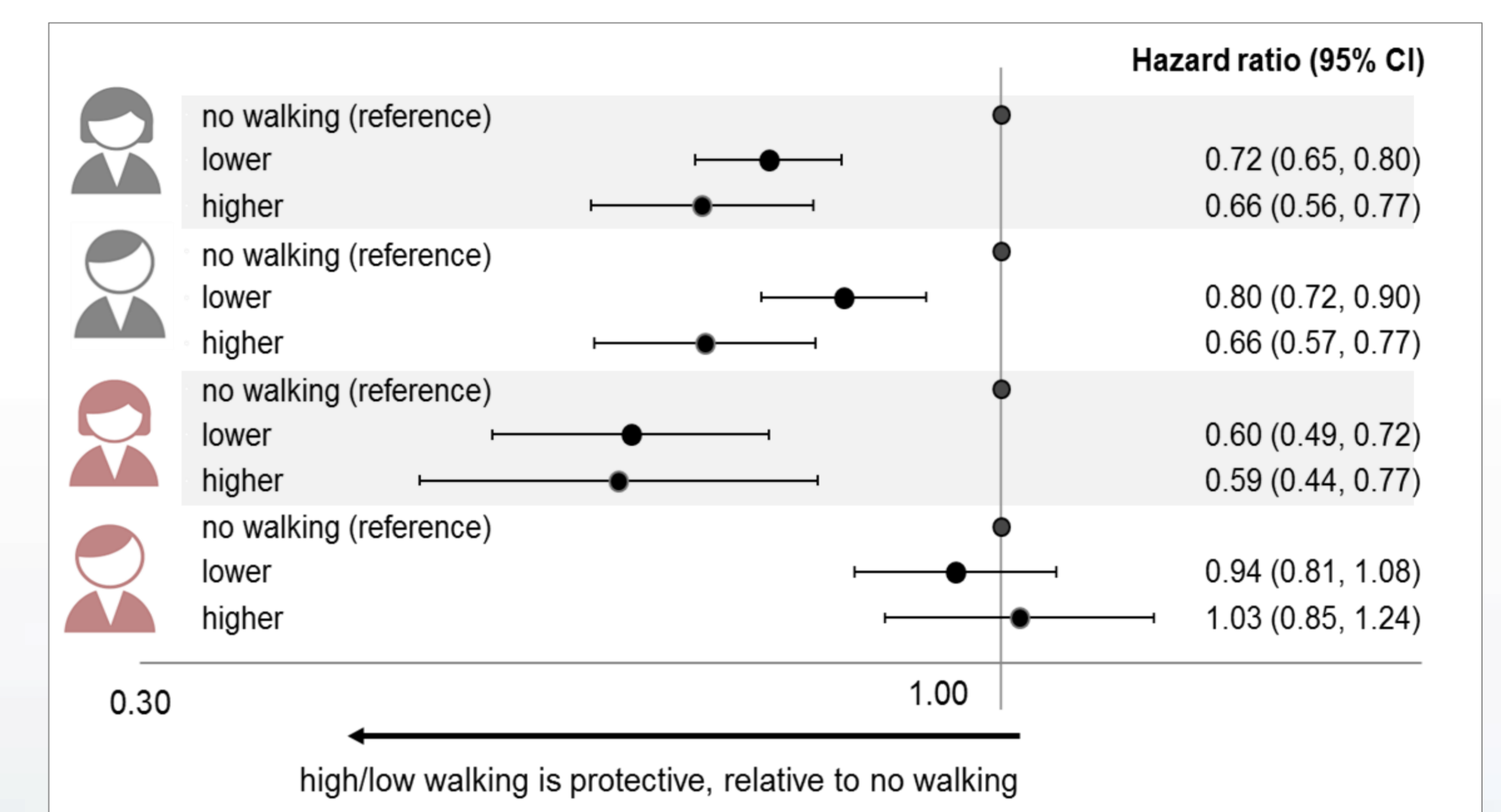


Figure 3. Association of walking with premature cardiometabolic mortality. Data are hazard ratios (95% CI). Models are adjusted for baseline age, education, income, presence of two or more chronic conditions, obesity, season, and survey cycle.

## Results 3: ALE and mortality

Favourable environments conferred a 19% reduction in cardiometabolic death (HR 0.81, 95% CI 0.66–0.98) for older women.

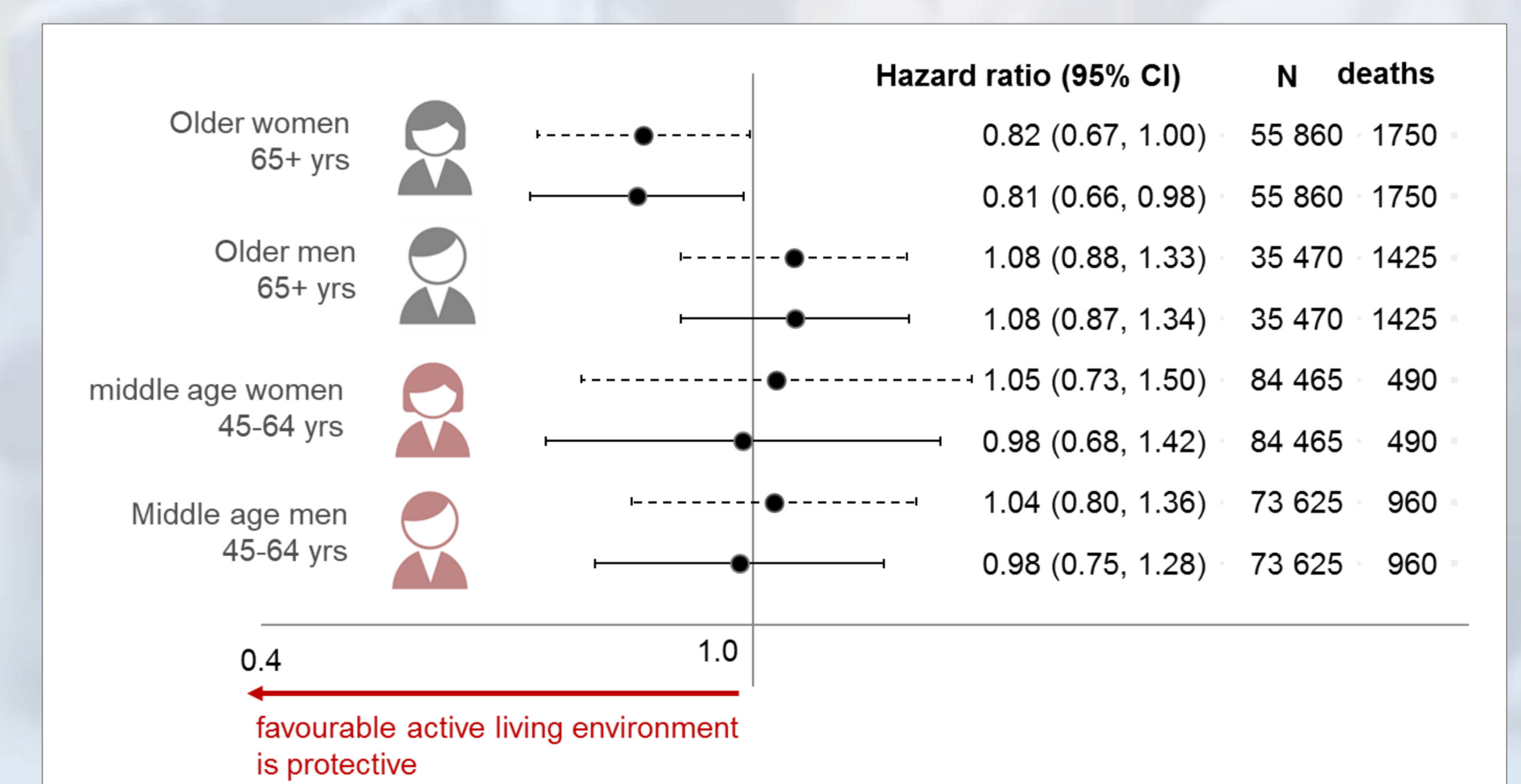


Figure 4. Association of the active living environment with premature cardiometabolic mortality. Data are hazard ratios (95% CI). Unadjusted models are adjusted for baseline age. Adjusted models account for baseline age, education, income, presence of two or more chronic conditions, obesity, and survey cycle.

On average, people walk more in favourable active living environments, regardless of sex and age. With the exception of middle age men, walking is associated with lower premature cardiometabolic death. Findings suggest that neighbourhood interventions to support active living are likely to have the greatest gains for older women.

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