# Neighbouring green space and all-cause mortality in elderly people in Hong Kong: a retrospective cohort study

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## Abstract

**Background** **The worldwide trend in population ageing has been met by a concomitant research interest in the effect of environmental factors on the health of elderly people. Green space is an important constituent of the living environment, with regard to modifying local air quality and microclimate, and has been qualitatively shown to benefit both physical and psychological aspects of health through several pathways. We aimed to quantitatively and comprehensively evaluate the effect of green space on all-cause mortality in elderly people in Hong Kong.**

**Methods** **In this retrospective cohort study, we studied the effect of green space on all-cause mortality in participants identified from a community-sourced cohort of Chinese elderly people (aged ≥65 years) who resided in all regions of Hong Kong between 2001 and 2014. The Normalized Difference Vegetation Index was assigned to a 300 m radius buffer around each residential address to identify the qualitative coverage of green space. The proportion of green space was calculated according to counts of pixels with green compared with the total counts of pixels (15×15 m). Mortality data were ascertained from the Government Death Registry over a 14-year follow-up. Cox proportional hazard models were used to estimate hazard ratio (HRs) and their corresponding 95% CIs for all-cause mortality, adjusted for demographic and socioeconomic characteristics, lifestyle, housing type, and years of living in Hong Kong. Additional covariates were added to the model to examine underlying mechanisms. The study was approved by the Clinical Research Ethics Committee of the Chinese University of Hong Kong, and all participants gave written informed consent.**

**Findings** **Of 3556 elderly participants, 795 (22%) died over the 14-year follow-up. A 10% increase in coverage of green space within a 300 m buffer of participants' addresses was associated with a reduction in all-cause mortality during a 1-month period (HR 0·96, 95% CI 0·94–0·98; p=0·03), after adjusting for sex, age, marital and socioeconomic status, current smoking status, housing type, and years of living in Hong Kong. 10·3% of the variation for the effect size of green space on all-cause mortality could be explained by particulate matter 2·5 concentration, physical activity, and cognitive mental status.**

**Interpretation** **Chinese elderly people living in greener neighbourhoods might have a lower mortality risk than those living in areas with less green space, independent of other confounding factors, although further studies with larger sample sizes recruiting participants from more diverse environments are needed. Our findings suggest that increasing the coverage of green space could be effective at constructing an age-friendly city and could promoting ageing by enhancing physical activity and cognitive mental function in elderly people, lessening the risk of all-cause mortality.**

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**Contributors**
DW contributed to the literature review, study design, data analysis, data interpretation, and Abstract editing. KK-LL contributed to data collection, analysis, and interpretation. RHYY and SYSW contributed to data analysis and interpretation. TCYK helped with the data collection, management, analysis, and interpretation. JW contributed to study design, data analysis, data interpretation, and Abstract re-editing.

**Declaration of interests**
We declare no competing interests.