# Greenness and education inequalities in life expectancy in Latin American cities: an ecological study

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## Abstract

**Background** Greenness has been found to be associated with reduced mortality and morbidity and improved wellbeing, with recent evidence further linking it to narrower health inequalities. However, results come mostly from high-income countries and thus might not be generalisable to other settings. In this preliminary analysis, we address this gap by examining whether education inequalities in life expectancy in Latin American cities vary by area-level greenness.

**Methods** We used data from the Salud Urbana en America Latina (SALURBAL) study. The analysis sample included 28 large cities in nine Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Panama, and El Salvador), comprising 671 sub-city units (>10 per city), for the period 2012–16. We used sub-city data on life expectancy, education (percentage of residents with high school or university education, as an indicator for socioeconomic status), and greenness (as calculated by the satellite image-derived normalised difference vegetation index). We used multilevel linear models of sub-cities nested within cities, with country fixed effects to predict life expectancy by education, greenness, and their interaction, while accounting for covariates at the city and sub-city levels.

**Findings** Higher education was associated with higher life expectancy in both sexes (men: standardised regression coefficient $b$=0·51 [95% CI 0·36–0·65]; women: 0·34 [0·23–0·45]), whereas increased area-level greenness was associated with higher life expectancy among men (0·39 [0·03–0·75]). The educational gradient in life expectancy was steeper in greener areas for both sexes (men: $b$ for interaction=0·20 [0·08–0·32]; women: 0·15 [0·05–0·24]).

**Interpretation** Contrary to evidence from high-income countries, our initial results from Latin America suggest education disparities in life expectancy might increase with greater levels of green space. Given the already wide intra-urban inequalities in Latin American cities, and the sparse and unequal distribution of urban green spaces, greening policies need to make a concerted effort to ensure that unequal access to green spaces does not exacerbate existing health inequalities.

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**Contributors**

MRM, DAR, and UB conceived the study and developed the hypotheses and analysis plan. MRM led the poster development. UB did the statistical analyses. DAR, UB, ID, YJ, KM, JJM, WTC, and AAdLF participated in or supported data collection. JJM, NG, WT, ID, YJ, KM, and AAdLF provided feedback on the research design and the interpretation of results. All authors read and approved the final version of the manuscript. DAR and JJM supervised the research.

**Declaration of interests**

We declare no competing interests.

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