Socio-spatial Inequalities in Changes in Exposures and Implications for Changes in Cardio-Metabolic Health

Juliette F.E. van Beek, Luxembourg Institute of Socioeconomic Research (LISER) (ESR 05)

Aim: To examine the relationships between socio-economic and physical environmental characteristics of residential neighborhoods over a 9-year period

WP 2: To understand the implications of changes in life stages and environments for health and health equity

Objectives:

1) To identify the socio-spatial inequalities in the distribution of changes in environmental exposure over 10 years that relate to cardio-metabolic risk factors;
2) Based on longitudinal data, to analyse relation between environmental factors and change in behavioural risk factors (PA, diet) and related disease;
3) To investigate how changes in exposures following residential relocation relate to inequalities in change in cardio metabolic health.

Central to thesis:

Physical activity
Sedentary behavior

Physical and social living environment

Current article & Hypotheses:

Associations between urban green space, population physical activity and sedentary behavior: a longitudinal country-wide study in Luxembourg

1) participants living in neighborhoods where green space increased, show increased levels of PA and decreased levels of SB,
2) participants living in neighborhoods where green space remained the same, show similar levels of PA and SA, and
3) participants living in neighborhoods where green space decreased, show increased levels of SB and decreased levels of PA

Effects of individual and neighborhood SES

Methods

ORISCAV-LUX

"Observation of risks and cardiovascular health in Luxembourg"

Wave 1

(Nov 2007-Jan 2009)

n=1432

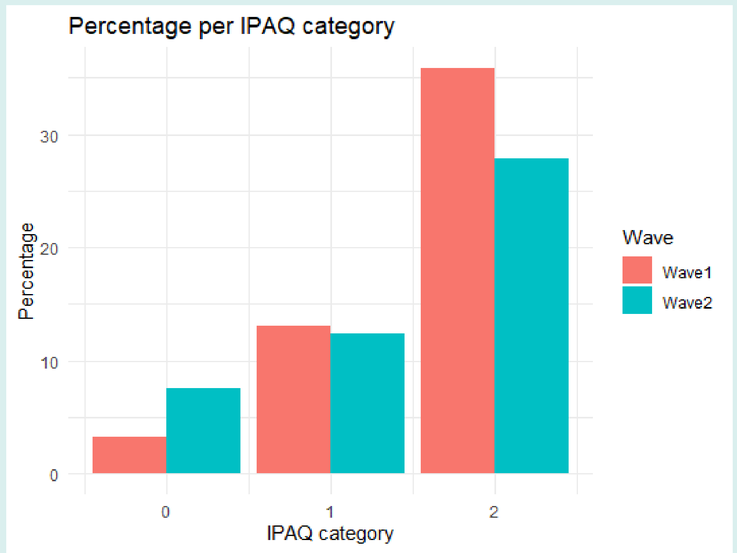
633 participants participated in both waves and are included in the MET'HOOD project

n=1558

Wave 2

(Jan 2016-July 2017)

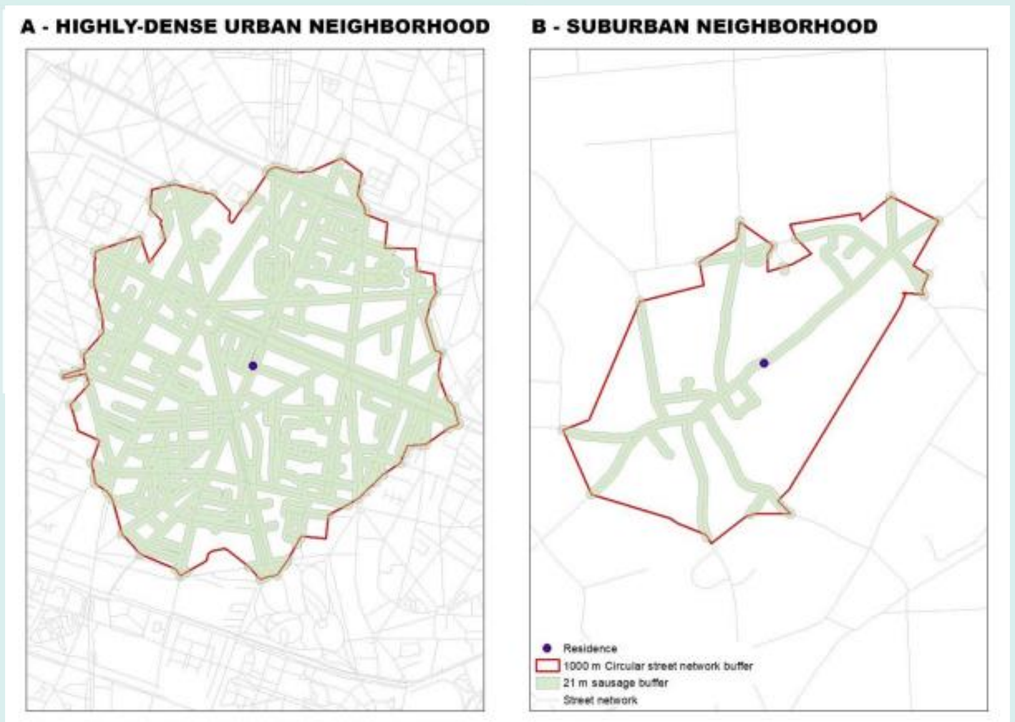
Network buffers 500, 800, 1000, 2000m



IPAQ categories: 0 – Inactive, 1 – Moderately active, 2 – Active

Environmental attributes considered:

Normalized Difference Vegetation Index (NDVI, LiDAR)	Soil Adjusted Vegetation Index (SAVI, Landsat)	Tree cover density (Copernicus)	High vegetation area (height >1.0m) (LiDAR)
Forest area (BD-L-TC, LIS-L)	Agriculture (LIS-L)	Natural surfaces (e.g. grassland, bushes) (LIS-L)	High vegetation volume (height >1.0m) (LiDAR)



Past, current and next activities

- Literature search
- Initial ideas
- First draft
- Complete draft
- Courses
- Preliminary dataset
- First results
- Choose measures
- Supplement dataset

References:
1) James, P., Banay, R.F., Hart, J.E. et al. (2015) A Review of the Health Benefits of Greenness. Curr Epidemiol Rep **2,** 131–142
2) Klicnik et al. (2021) Leisure sedentary time and physical activity are higher in neighbourhoods with denser greenness and better built environments: an analysis of the Canadian Longitudinal Study on Aging. *Applied Physiology, Nutrition, and Metabolism*. **47**(3)
3) Tsao et al. (2022) Forest Bathing Is Better than Walking in Urban Park: Comparison of Cardiac and Vascular Function between Urban and Forest Parks. *International Journal of Environmental Research and Public Health* 19, no. 6: 3451
4) Chiang, Li, Jane, (2017) Wild or tended nature? The effects of landscape location and vegetation density on physiological and psychological responses, Landscape and Urban Planning (167) , Pages 72-83,
5) Zięba-Kulawik, Skoczylas et al. (2021) Monitoring of urban forests using 3D spatial indices based on LiDAR point clouds and voxel approach, Urban Forestry & Urban Greening (65), 127324
6) De Keijzer, Bauwelinck & Dadvand (2020) Long-Term Exposure to Residential Greenspace and Healthy Ageing: a Systematic Review. Curr Envir Health Rpt 7, 65–88
7) Besser et al. (2021) Methods to Address Self-Selection and Reverse Causation in Studies of Neighborhood Environments and Brain Health. International journal of environmental research and public health, 18(12), 6484.

LISER LUXEMBOURG INSTITUTE OF SOCIO-ECONOMIC RESEARCH

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 956780

LUXEMBOURG INSTITUTE OF HEALTH