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Enriching Longitudinal Population Study Data with Neighbourhood Mobility Indicators at the UK Longitudinal Linkage Collaboration

Abigail Harrison¹, Richard Thomas¹, and Andy Boyd¹

¹ UK Longitudinal Linkage Collaboration, Population Health Sciences, University of Bristol, UK

Introduction & Background

UK Longitudinal Linkage Collaboration (UK LLC) is the national Trusted Research Environment (TRE) for data linkage in longitudinal research. UK LLC currently brings together data from >24 Longitudinal Population Studies (LPS), supporting the linkage of participants' study data with health, socio-economic and place-based records; and provides researchers with access to integrated and linked study data.

Objectives & Approach

We describe the methodology to facilitate the linkage of neighbourhood level (census boundaries including Lower and Middle Super Output Areas) mobility datasets with an LPS databank in a privacy-preserving manner. We explore how data triangulation (public transport accessibility indicators, indices of deprivation and healthcare records) can support research for public good and help to inform policy decisions for improved transport networks, health and wellbeing.

Relevance to Digital Footprints

UK LLC's starting point for linking to mobility data is with the Public Transport Accessibility Indicators developed by the Urban Big Data Centre. Understanding public transport access to services including GP's, hospitals, schools, employment and urban centres is important for research relating to, for example, public health, epidemic control, and urban planning.

Results

Mobility data can complement longitudinal study data and other linked place-based indicators and health records. Existing research has found relationships between mental and physical health, walkable neighbourhoods, area deprivation, connectivity, residential density, and active living. UK LLC enables the triangulation of different sources of data, such as car ownership, public transport access and healthcare interaction, giving a more balanced perspective. The benefits of

linking all these datasets together are that it maximises descriptive cohort variables with long-term outcomes and allows for a broader scope of analyses.

Conclusions & Implications

UK LLC is a unique, multi-faceted resource that facilitates triangulation of different sources of data to give a more balanced and robust perspective. We have implemented a decision-making framework, which mitigates risks, including disclosure resulting from neighbourhoods with unique and identifiable qualities. Variables are transformed using risk-based criteria with an emphasis on reducing re-identification risk while retaining analytic value. Our control measures balance data utility and the context in which the data is analysed to make informed decisions on the controls required. Mobility data covering indicators such as walkability and public transport access can support the investigation of the health and social impacts of urban planning. It can also support policy that develops neighbourhoods which promote walking and improve population health.

Keywords

trusted research environment, GeoSpatial, linkage

