

Close residential proximity to busy roads may deter local walking among adults

Results from a survey of four English neighbourhoods

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Background

Traffic and transport infrastructure can signal an area's socially beneficial economic vitality but can also cause harm by inhibiting pedestrian mobility. Living near busy roads is associated with increased cardiovascular mortality (1). The pathways of community severance (the negative impacts of busy roads on local people's health) are unclear owing to inadequate metrics(2). We investigated the association between residential proximity to busy roads and perceived ability to walk locally, using a novel cross-sectional survey developed to measure community severance.

Methods

Participants (N=755; aged ≥ 18 y; 54% female) were randomly selected from addresses in four English neighbourhoods (Fig.1) thought to be affected by community severance, each bisected by a major road. A questionnaire measured participants' demographic, socioeconomic and health characteristics, travel behaviours, and perceptions of neighbourhood traffic and transport infrastructure.

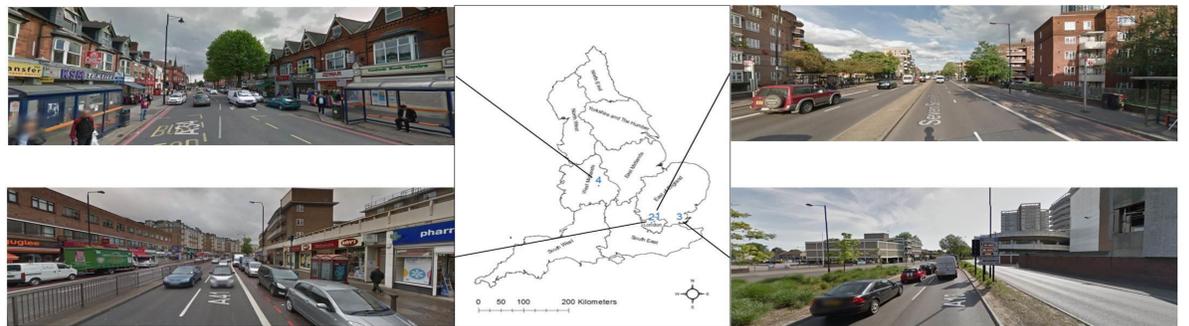


Fig 1. Locations of case study areas and Google Street Views as examples of roads reported as participants' busiest.

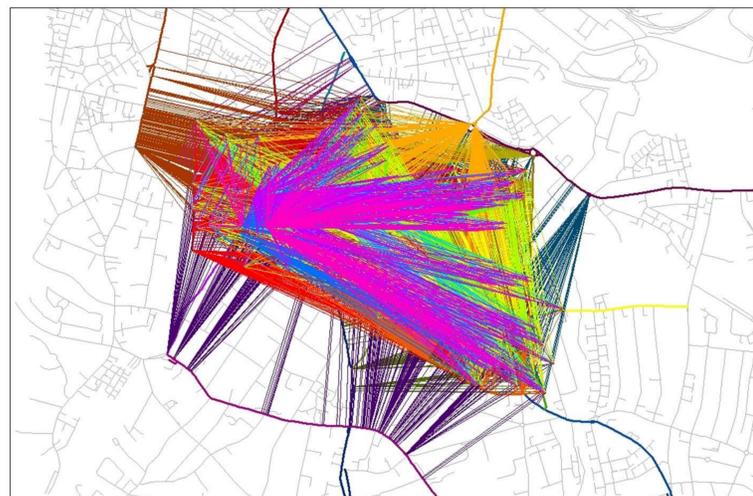


Figure 2. Participants were mapped in relation to the busiest roads

Distances to participants' busiest roads were determined using Geographic Information System (GIS) software (ArcGIS, version 10.3, ESRI Redlands, CA). The OS MasterMap Integrated Transport Network (road) and Urban Paths (footpath) layers (Ordnance Survey) were combined to produce a network dataset. The busiest road identified by each participant was linked in an attribute table to their geolocation, derived from their residential address, so that participants could be mapped relative to their busiest road (Fig.2). The distance along the road and the path network from their home to the busiest road was calculated using the Network Analyst extension in ArcGIS (Fig.3). Associations between this distance and the extent to which traffic speed or volume affected participants' perceived ability to walk locally were estimated by logistic regression.

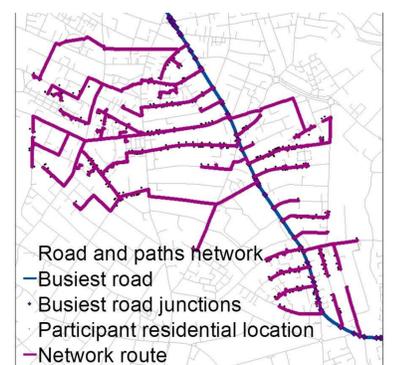
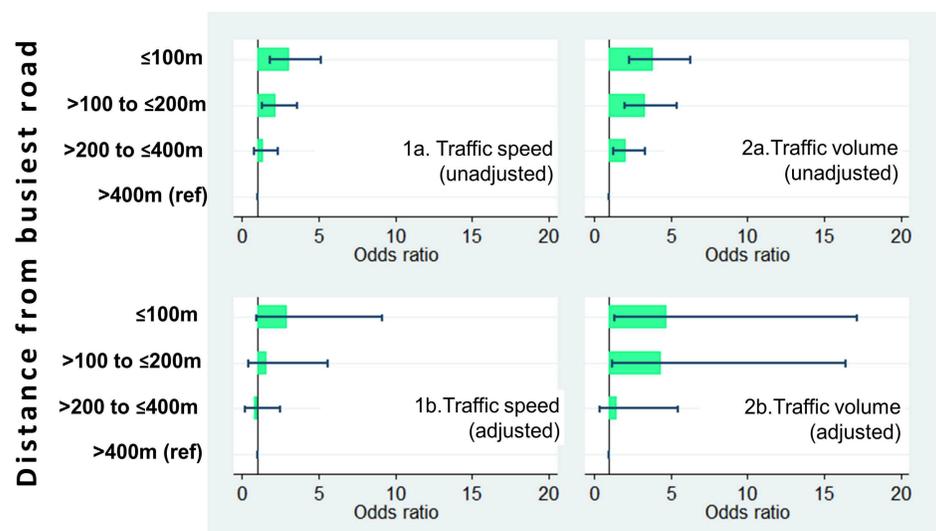


Figure 3. Distance along the road and path network was determined for each participant

Results

Traffic speed was reported by 32% of participants, and traffic volume by 40%, as often/always affecting their ability to walk locally. Compared with participants who lived >400 m from their busiest road (the reference category), those who lived ≤ 100 m from it had threefold odds of reporting that traffic speed often/always affected their ability to walk locally (OR 3.1, 1.9-5.1); those who lived >100 m to ≤ 200 m from it had double the odds (OR 2.2, 1.3-3.6) (Graph 1a). However, these became non-significant with adjustment for demographic & socioeconomic factors (3.0, 1.0-9.2; 1.6, 0.5-5.6, respectively) (Graph 1b). Similarly, those who lived ≤ 100 m from their busiest road had almost four times higher odds of reporting that traffic volume often/always affected their ability to walk locally (OR 3.8, 2.3-6.3); those living >100 m to ≤ 200 m from it had over threefold odds (OR 3.3, 2.0-5.4) (Graph 2a). These associations remained significant after adjustment for demographic & socioeconomic factors (4.8, 1.3-17.1; 4.3, 1.1-16.4, respectively) (Graph 2b).



Graph 1. Odds of ability to walk locally being often or always affected by traffic speed (1) and traffic volume (2) – before (a) and after (b) adjustment for demographic and socioeconomic factors – versus less frequently being affected for various distances from the busiest road relative to the reference category of >400 m.

Conclusions

Closer residential proximity to the road considered the busiest locally is associated with greater likelihood that local traffic speed and volume will often or always affect residents' ability to walk in the area. A deterrent effect of busy roads on local walking, and therein health-promoting physical activity, warrants further investigation.

References: (1) Gan WQ, Tamburic L, Davies HW, Demers PA, Koehoorn M, Brauer M. Changes in residential proximity to road traffic and the risk of death from coronary heart disease. *Epidemiol Camb Mass.* 2010 Sep;21(5):642–9. (2) Mindell JS, Karlsen S. Community Severance and Health: What Do We Actually Know? *J Urban Health Bull N Y Acad Med.* 2012 Apr;89(2):232–46.