Developing a suite of tools to measure community severance

Jennifer S. Mindell[a], Paulo Rui Anciaes[b], Ashley Dhanani[c], Jemima Stockton[a], Peter Jones[b], Muki Haklay[d], Shaun Scholes[a], Nora Groce[a], Laura Vaughan[c]

[a] Research Department of Epidemiology & Public Health, Faculty of Population Health Sciences, UCL; [b] Centre for Transport Studies, Faculty of Civil Environmental & Geomatic Engineering, UCL; [c] Space Syntax Laboratory, Bartlett Faculty of the Built Environment, UCL
[d] Chorley Institute, Faculty of Civil Environmental & Geomatic Engineering, UCL

For correspondence: j.mindell@ucl.ac.uk
Further information: **wwww.ucl.ac.uk/street-mobilityw.ucl.ac.uk/street-mobility**

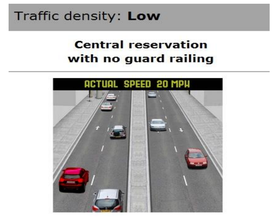
Community Severance Measurement Toolkit

A. Introduction
B. Evidence summary
C. Participatory mapping / street surveys
D. Health & Neighbourhood Mobility questionnaire
E. Valuation tool
F. Walkability models
G. Video surveys
H. Other tools
   – Street audits of pedestrian environment eg PERS, Living Streets
   – Space syntax

C. Participatory mapping

D. Self-completion questionnaire

E. Stated preference survey to develop valuation tool



Option A

Cross *at closest point*

(not at pedestrian crossing)

Option B

Use *covered over road*

Adds *x* mins to your journey

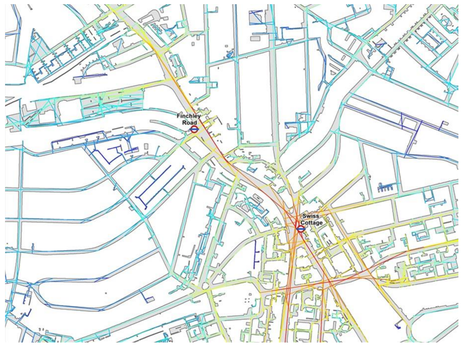
Option C

Avoid crossing

H1. Street audit

PERS (Pedestrian Environment Review System)
Links & Crossings

H2. Space syntax



G. Video surveys

- **Motor traffic flows**
- **Pedestrian flows**
- **Crossing behaviours**

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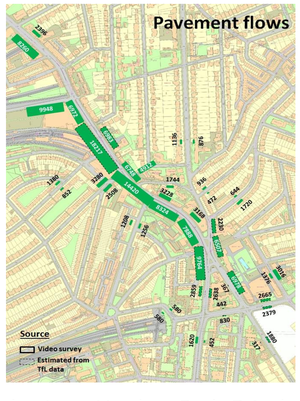
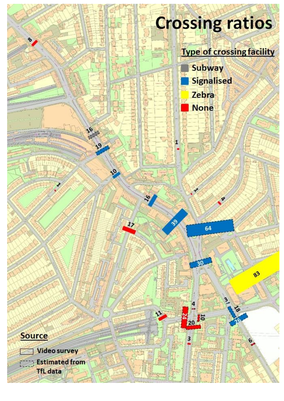
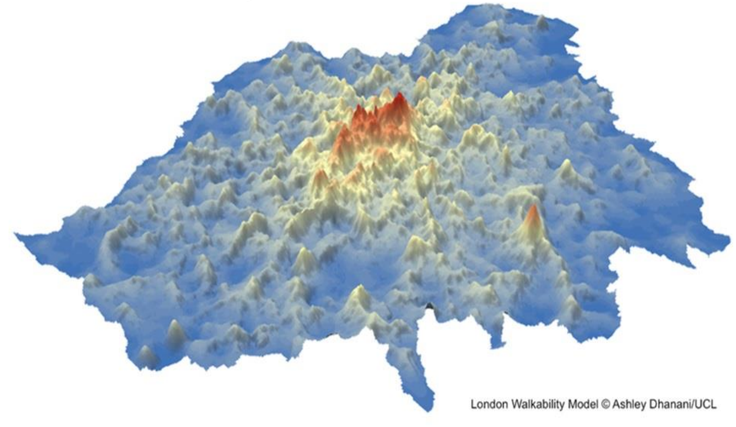




F. Walkability model



London Walkability Model © Ashley Dhanani/UCL

On behalf of the Street Mobility and Network Accessibility team: Jennifer S Mindell, Nora Groce, Muki Haklay, Peter Jones, Shaun Scholes, Laura Vaughan, Paulo R Anciaes, Sadie Boniface, Barbara Bonney, Ashley Dhanani, Louise Francis, Rebecca Payne, Jemima Stockton, Sadaf Sultan Khan, Lusine Tarkhanyan

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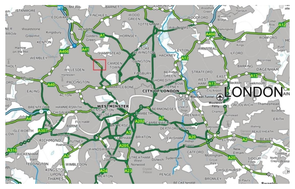
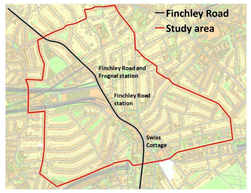
Introduction

There is a lack of tools to identify and measure community severance caused by large roads and motorized traffic, despite evidence of the negative impacts on local communities. We report the development of a suite of tools to measure community severance, undertaken for the Street Mobility and Network Accessibility research project.

Community severance* occurs when transport infrastructure and/or the speed or volume of traffic interferes with individuals' ability to access goods, services, and personal networks (1). The concept has been defined in many ways since the 1960s, usually emphasizing the barrier effect of roads on the movement of pedestrians (2; 3). However, severance is a broader phenomenon, impacting on what people do - or do not do - and on how they feel (1). Despite being often mentioned in both the transport and health literatures, community severance and its potential effects on health and wellbeing have been little studied (2). One difficulty has been identifying and measuring severance. A number of methods have been proposed (4) but none have been operationalized. Following an extensive, multidisciplinary literature review, we proposed a broader definition to account for wider spatial and social processes which shape the impact of community severance on an area over time.

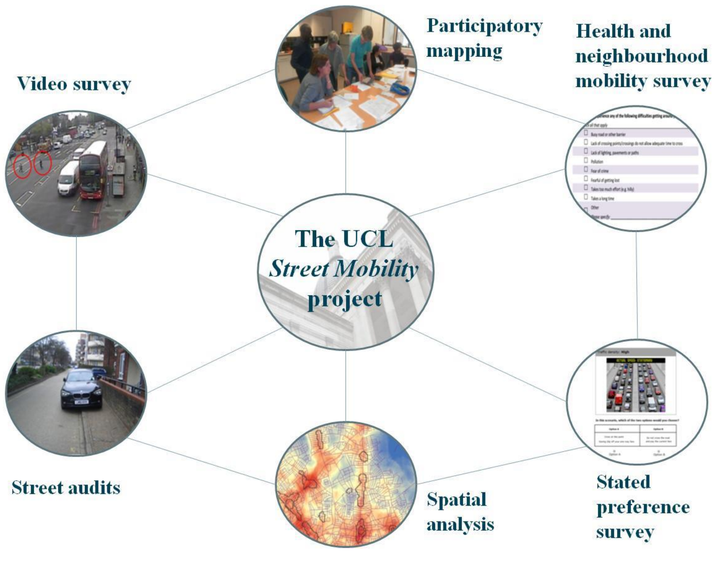




Aim

The aim of the Street Mobility and Network Accessibility project (www.ucl.ac.uk/street-mobility) was to develop a suite of tools to measure community severance and its impacts. This poster summarizes development of these tools and their validation through triangulation of findings in a case study of an arterial road. Triangulation is the combination of methods in the study of the same phenomena. This technique is particularly useful because convergence of results from methods using different approaches provides evidence that the results are valid, not artefactual. It also provides a more complete picture. The observation of elements of both the built environment and human behaviour using a combination of qualitative and quantitative methods allows for broad understanding of the causes and consequences of community severance.

Summary of methods used to develop the toolkit



* Our new definition of community severance

Transport-related community severance is the variable and cumulative negative impact of the presence of transport infrastructure or motorised traffic on the perceptions, behaviour, and well-being of people who use the surrounding areas or need to make trips along or to cross that infrastructure or traffic. (3)

"I saw a car driver shaking his fist and pulling road rage faces at a poor lady trying to cross the road - she was so flustered he was banging on his horn - frightened the life out of her" (Female, 45, participatory mapping)

Methods

New tools include: participatory mapping, a health and neighbourhood mobility survey, video surveys, a walkability model, and a valuation tool (based on stated preference survey findings), used alongside space syntax and street audits. The network distance from the busiest road was determined using Geographic Information System (GIS) software (ArcGIS, version 10.3) and was grouped into four categories. The tools were tested around Finchley Road, a busy arterial road in North London, England.

Results from the different tools were validated through triangulation of findings. Primary data from each measurement tool and secondary data from external sources were first analysed separately. The results from the different approaches were then compared thematically, to assess the extent to which the findings contradicted or supported conclusions from other tools.

Table 1: Perceptions of survey participants of factors affecting their ability to walk around the local area

Factors	Never affected (%)	Occasionally affected (%)	Often or always affected (%)
Volume of traffic, N (%)	109 (53%)	66 (32%)	30 (15%)
Speed of traffic, N (%)	111 (54%)	65 (32%)	29 (14%)
Other, N (%)	160 (79%)	29 (14%)	14 (7%)

Results

We summarise a selection of the findings, by theme

Walkability and connectivity

Space syntax showed that Finchley Road is structurally important for pedestrian activity. The walkability model shows that Finchley Road is one of the peak walkability areas in London. However, traffic flow data showed that it is also the arterial with the highest motorised traffic levels of any non-motorway road in London. This co-existence of heavy traffic and high walkability suggests community severance will be high. Free text comments from participants confirmed this.

"Finchley Road is probably the most congested, dangerous, noisy, dirty road in the world." (Male, 65-74, Health and neighbourhood mobility survey)

Mobility and accessibility

Motor traffic flows are high (39,500-46,500 vehicles 07.00-24.00), with a high proportion of heavy good vehicles and buses/coaches/ Almost half the survey participants reported that volume or speed of traffic at least occasionally affected their ability to walk round their local area (Table 1); there were greater problems for those living closer to the busiest road (Table 2). The mapping of PERS scores of pedestrian links also revealed that there are clusters of links with poor pedestrian environment in other parts of the study area, away from Finchley Road, decreasing the connectivity between the different neighbourhoods.

Table 2: Relationship between travel or health factors and network distance from the busiest road (age-standardised across categories of network distance)

Characteristic	Network distance from the busiest road				p value
	≤100m	>100 to ≤200m	>200 to ≤400m	>400 to ≤800m	
N	46	24	53	60	
Self-reported health and wellbeing					
Poor self-reported health (%)	0	1	5	2	0.321
Limiting longstanding illness (%)	16	36	14	9	0.125
Lowest decile of wellbeing (%)	**19**	**0**	**5**	**0**	**0.007**
Problems often or always affecting ability to walk around the local area					
Speed of traffic (%)	**25**	**18**	**6**	**8**	**0.031**
Volume of traffic (%)	**25**	**18**	**7**	**7**	**0.040**

Crossing the road

Crossing Finchley Road is a major challenge for pedestrians. Street audits revealed that crossing is not physically possible along the section with highest pedestrian flows due to the existence of guard railings and walls. The number of signalised crossings is insufficient, with long waiting times (up to 2 minutes) to cross at the few crossings. 18% of survey participants mentioned lack of crossing points as a difficulty they encounter; 25% said the signalised crossings did not allow adequate time to cross. Most existing formal crossing points had a negative street audit score, mainly due to delay, poor legibility, and gradient.

Health and wellbeing

People living closer to the busiest road had lower wellbeing (Table 2).

Noise and air pollution

These were mentioned by 36% of survey participants as barriers to walking around their local area. It was more common among those living closest to their busiest road ($p<0.001$). The mean NO_2 level for the year 2014/15 was 61µg/m³, 21µg/m³ more than the EU annual limit (40 µg/m³).

Conclusion

Analysis shows coherence between findings from the different measurement tools applied individually and also reveals interconnections between factors which contribute to severance, demonstrating overall reliability of the suite of tools for assessing community severance in urban areas.

References

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