

Equity in new active travel infrastructure: a spatial analysis of London's new Low Traffic Neighbourhoods

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Highlights

- Article examines equity of new Low Traffic Neighbourhood (LTN) implementation in London, UK, March-September 2020.
- Across London, people in deprived areas were much more likely to live in a new LTN than people in less deprived areas.
- Across London, Black, Asian and Minority Ethnic (BAME) people were slightly more likely to live in a new LTN than White people.
- Individual districts varied widely: more deprived or BAME people were more likely to live in an LTN in some districts, less likely in others.
- At the micro-level, LTN residents were demographically similar to neighbours in immediately adjacent areas.

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Abstract

In this article we examine equity in new active travel infrastructure in London, UK. We focus on Low Traffic Neighbourhood schemes (LTNs) introduced during Covid-19. These mainly involve 'modal filters' that restrict through motor traffic from residential streets. Such approaches to traffic management are traditional in the Netherlands, but relatively new in London and other global cities such as Barcelona. LTNs are often controversial, with one criticism being that they are implemented in affluent areas and hence benefit richer residents. London represents an excellent opportunity to investigate the extent to which these rapidly introduced schemes have so far been equitably distributed.

We focused on LTNs introduced between March and September 2020 and still present at the end of October 2020. Having generated datasets representing these new LTN locations and their boundary roads, we matched these to Output Areas (OAs, administrative areas containing around 300 residents). We then examined the extent to which LTN implementation was associated with age, ethnicity, disability, employment and car ownership (Census 2011) and small-area deprivation (Index of Multiple Deprivation 2019).

We estimated that 3.7% of all Londoners live inside a new LTN, and 8.8% live within 500m walking distance of a new modal filter. Across London as a whole, people in the most deprived quarter of OAs were 2.7 times more likely to live in a new LTN, compared to Londoners in the least deprived quarter. While overall Black, Asian and Minority Ethnic (BAME) people were slightly more likely than White Londoners to live in a new LTN, this varied by ethnic group. Specifically, Black Londoners were somewhat more likely, and Asian Londoners somewhat less likely than White people to live in a new LTN. Car-free households were more likely to live in a new LTN.

Within London's districts – which lead the implementation of LTNs - there was wide variation, with people in more deprived areas and/or ethnic minorities more likely to live in an LTN in some districts, less likely in others. In the median ('typical') district, people in more deprived areas were more likely to live in an LTN than people in less deprived areas, suggesting that, on average, individual districts have prioritised their more deprived areas. However, in the median district, BAME residents were slightly less likely to live in an LTN than White residents. Finally, at the micro level, residents living in LTNs were demographically similar to neighbours living in OAs that touched an LTN boundary road.

We conclude that LTN implementation has been broadly equitable at the city level and at the micro level, but not always at the district level. Such metrics should be used in policy and research to monitor and improve the equity of active travel interventions.

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Main article

1. Introduction

Many cities and countries, including London and the UK, have ambitions to build walking and/or cycling (active travel) infrastructure to reduce air pollution and carbon emissions, and increase physical activity. With the Covid-19 pandemic, addressing such issues, and providing space for physical distancing, became an urgent necessity (Connolly, 2020; Dunning and Nurse, 2020). With residents unwilling or unable to use public transport (Papa and Badstuber, 2020), appropriate active travel infrastructure became a key priority. However, both in London and other contexts, this infrastructure was often absent or, when present, of poor quality and/or with disparities in access. For example, London cycle superhighways have specifically targeted those commuting to the city centre, which may exclude some trip purposes and some demographics less likely to commute.

Equity in active travel is generally under-researched, particularly for interventions introduced in response to Covid-19. This paper examines the implementation of 'modal filters'¹ across London between March and September 2020, and the areas that such filters have made into 'low traffic neighbourhoods' (LTNs). We examine the provision of these new LTNs at the small area level, in relation to demographic indicators, including ethnicity, area deprivation and disability.

2. Equity and active travel environments

Equity is increasingly a concern of transport planners and researchers, with key studies highlighting the societal cost of unequal access to transport in terms of health disparities, social deprivation, social exclusion and poverty (Lucas, 2012; Lucas et al., 2016; Lucas and Jones, 2012). Research has shown how negative impacts of motorised transport are usually unevenly distributed, with vulnerable communities disproportionately affected by transport-related air pollution (Barnes et al., 2019; Fecht et al., 2015; Jephcote et al., 2016) or climate change effects (Walker and Burningham, 2011).

Relatively less is known about the distribution across different population groups of access to active travel interventions (Braun et al. 2019) – i.e. a transport 'good' that has the potential to promote health by increasing active travel (Woodcock, Givoni, & Morgan, 2013; Rabl and de Nazelle, 2012). Here we examine (in)equality in the provision of LTNs, a type of active travel infrastructure with substantial potential to improve conditions for walking and cycling (Aldred and Goodman, 2020).

¹ A 'modal filter' is a bollard, camera gate, planter, or other street feature that restricts motor traffic fully or partially (the latter might involve a camera-controlled bus gate, or other specific exemptions such as local refuse vehicles). They are intended to reduce through motor traffic on a neighbourhoods' streets.

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Ensuring equitable access is vital for increasing uptake of healthy mobility among people often with fewer other options (e.g. more likely to be living without a car). In addition, providing a better environment for existing low-income walkers or cyclists has key equity implications: these may be 'no-choice' active travellers (Bostock 2001), often having to walk or cycle in relatively risky environments (Aldred 2018).

So far, the use of spatial analysis to explore the distribution of active travel infrastructure mostly covers North or Latin America, and predominantly cycling rather than walking infrastructure. It often finds inequitable distribution, with lower access to cycling infrastructure in more deprived areas (e.g. Braun et al., 2019; Flanagan et al., 2016; Hirsch et al. 2017; Parra et al., 2018; Teunissen et al., 2015; Tucker and Manaugh, 2018); although this is not always the case (Pistoll and Goodman, 2014; Houde et al., 2018). Equity analyses of pedestrian infrastructure or walkability have more mixed results. These mixed findings may partly reflect greater variation between studies in how walkability is defined (e.g. 'presence of a footway' is used as an indicator in North American studies but would be taken for granted in Northern European cities). It also reflects variation between cities and countries in the historical and contextual factors that have shaped the relationship between pedestrian resources and household disadvantage (Macintyre, 2007).

Thus, a systematic review by Jacobs et al. (2019) shows a varied picture across Western countries. They found that higher deprivation was associated with reduced access to green space. Beyond this, there was no clear association between socioeconomic factors and presence of walking infrastructure across countries, but overall slightly more positive than negative associations between deprivation and walkability. A North American study (Thornton et al., 2016) found that the association of microscale walkability features with diversity and deprivation varied: more diverse and deprived areas tended to have more crossings and footways, but poorer aesthetic characteristics and more signs of disrepair such as litter or broken glass. A recent study of eight capital cities across Europe (Bartzokas-Tsiompras et al., 2020) found that the highest quality pedestrian environments were in affluent central areas, with far lower quality environments in surrounding more deprived areas.

Many of the UK studies that cover walkability focus on access to parks and greenspace, and mirror the international literature in finding lower access in more deprived areas (Mitchell and Popham, 2008; Wheeler et al., 2015; Ferguson et al., 2018; Mears et al., 2019). One study that looked at walkability more widely is Kenyon and Pearce's (2019) analysis of walkability in Glasgow and Edinburgh. The authors measure walkability by combining residential density, intersection density and destination accessibility. They found that walkability is generally worse for people living in more affluent areas, with lower densities being the determining factor. This was also found in a study by Zandieh et al. (2017) in Birmingham. The analysis does not, however, include aspects related to the aesthetics, quality or safety of the walking environments, potentially crucial for walking uptake (Adkins et al., 2017) as well as enjoyment.

In summary, access to cycling infrastructure is often (though not always) lower in more deprived areas. Definitions of walkability based on accessibility or density tend to suggest a relatively fair distribution of walking environments, but this appears less the case when including indicators of pedestrian environment quality, such as aesthetics or presence of greening. In addition, lower income groups and ethnic minorities are consistently found to have lower access to private and public green spaces. Hence, active travel infrastructure that increases the environmental quality of neighbourhood streets may be particularly important for these groups.

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Levels of motor traffic are, we would argue, a crucially under-studied part of the pedestrian environment quality equation. This goes beyond whether a street is designated 'major' or 'minor'. Hart and Parkhurst (2011), repeating Donald Appleyard's (1969) classic study, found substantial differences in sociability and quality of life for people living on an urban residential street without through motor traffic, compared to one carrying substantial through traffic. The impact of reducing motor traffic on local streets can be profound and fast: LTN measures, introduced between 2015-9 in the London Borough (district) of Waltham Forest, increased active travel within a year, particularly walking, and within two years reduced car use and/or ownership (Aldred and Goodman, 2020; Goodman et al., 2020). This suggests that LTN implementation may improve the convenience of walking or cycling and/or improve environmental quality. Such changes could substantially contribute to creating more equitable urban spaces if implemented in more deprived areas where residents lack private greenspace, yet conversely could aggravate gaps if concentrated in affluent areas.

3. Case study: London

Within London, there is substantial variation in the quantity and quality of transport provision, including active travel infrastructure, and, relatedly, in travel behaviour. Analyses of walkability in terms of residential dwelling density, street connectivity and land use mix show a clear radial decay in the index from centre to periphery (Stockton et al., 2016). Although walking levels are high relative to the rest of the UK and also to other European cities, there is scope for further growth and shifting short trips away from car use. This is reflected in the city-wide goal that 80% of trips be made by walking, cycling, or public transport by 2041, compared to 63% today (Transport for London, 2018).

London has a mayoral system with the Mayor overseeing the regional transport authority, Transport for London. Transport for London controls around 5% of the capital's roads, including many primary (A) class roads. The remaining 95% of roads are under the control of London's 33 districts. Hence, interventions on residential streets, including LTNs, tend to be led by districts, even if funded by Transport for London.

Across London, around 90% of people from a range of demographic groups live on residential streets (Aldred and Verlinghieri, 2020). London's minor streets have seen an increase of 72% in motor traffic over the past decade, while traffic on its major roads fell by 3% (DfT, 2020). This has provided an additional argument for LTNs, introduced at pace during Covid-19 in the UK capital through emergency provisions allowing expedited implementation with concurrent consultation. By restricting motor traffic volumes on residential streets using 'modal filters', LTNs can create streets where pedestrians may use more of the carriageway, and space is freed up to install parklets, benches, and other street furniture. During the Covid-19 pandemic, LTNs specifically aim to provide more physical distancing space, especially with a rise in jogging and running on sometimes narrow footways. If perceived to be successful they may be made permanent, and more introduced, aiming to avert a car-based recovery which would place stress on local roads and further worsen air quality.

Despite evidence of benefits, active travel interventions remain highly controversial in the UK. Cycle tracks have long been the subject of complaint, legal action, and even sabotage in London and the UK, and more recently, the same has been true of LTNs (e.g. see Edwards, 2020). As well as opposition referencing the right to drive, some resistance to LTNs has been framed through an equity/environmental/health lens. For instance, LTNs have been characterised as being predominantly implemented in affluent parts of London and/or, at a more micro level, of unfairly diverting motor traffic from affluent residential streets inside the LTN to poorer and more ethnically diverse boundary roads and areas. Our paper responds to this debate by examining the extent to

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which LTNs have been distributed in an equitable manner, or whether they have been concentrated in particular types of area within the city or within districts.

4. Methodological approach

4.1 Research questions

This study uses a spatial equity approach to examine where new LTNs have been implemented in London between March 2020 (when the first Covid-19 lockdown started) to September 2020 (the time when this research project started).

Our analysis addressed the following research questions:

1. With respect to key dimensions of equity (e.g. ethnicity, deprivation), how equitably are LTNs distributed across London?
2. Are there salient differences between LTNs and immediately adjacent areas?
3. Are any relationships (or lack thereof) observed for London as a whole also present within individual districts?

We include the second research question because boundary roads and/or adjacent areas might experience at least short-term traffic displacement after introducing a new LTN. In addition, while LTNs can benefit people living in adjacent areas through increased opportunities to make local trips by foot or by bicycle, the magnitude of this benefit is expected to be even greater for residents living inside an LTN, who also enjoy the benefits of reduced motor traffic in the street that they live on. As such, differences in demographic characteristics between LTN areas and adjacent areas might indicate an equity issue, even without any sustained disbenefit to adjacent areas.

The third research question is important because 95% of London's roads are controlled by the 33 districts rather than by its regional transport authority, and therefore districts are responsible for deciding whether, where, and how LTNs are implemented². Hence it is crucial to examine how equitably individual districts are pursuing LTN policies, as well as examining the picture across London as a whole.

4.2 Identifying new modal filters and LTNs

We compiled a dataset of modal filters, LTN areas and associated boundary roads, covering measures implemented between March - September 2020 and still in place by the end of October 2020.³ There was no official spatial dataset for London of the location of new modal filters nor for the boundaries of LTNs. Therefore, we compiled this information ourselves using district websites; the Transport for London website⁴; and the Gazette⁵, the official record of traffic orders. We contacted district officers, councillors, and/or civil society groups in all 33 districts to check our maps and/or source additional information. This was an iterative process following which we shared a draft map on social media⁶ and obtained further comments, including from local residents supporting or

² However, note that this will depend on funding, which in the case of these interventions mostly came via Transport for London.

³ With a constantly changing implementation picture, some cut-off was needed, and March-September covered many (though not all) schemes funded in the first wave of funding.

⁴ <https://data.london.gov.uk/dataset/cycling-infrastructure-database>

⁵ <https://www.thegazette.co.uk/>

⁶ https://www.google.com/maps/d/u/0/viewer?mid=1m_ZQHAQOWGRu7-IZDP-gbV8Mr6ZfMOj

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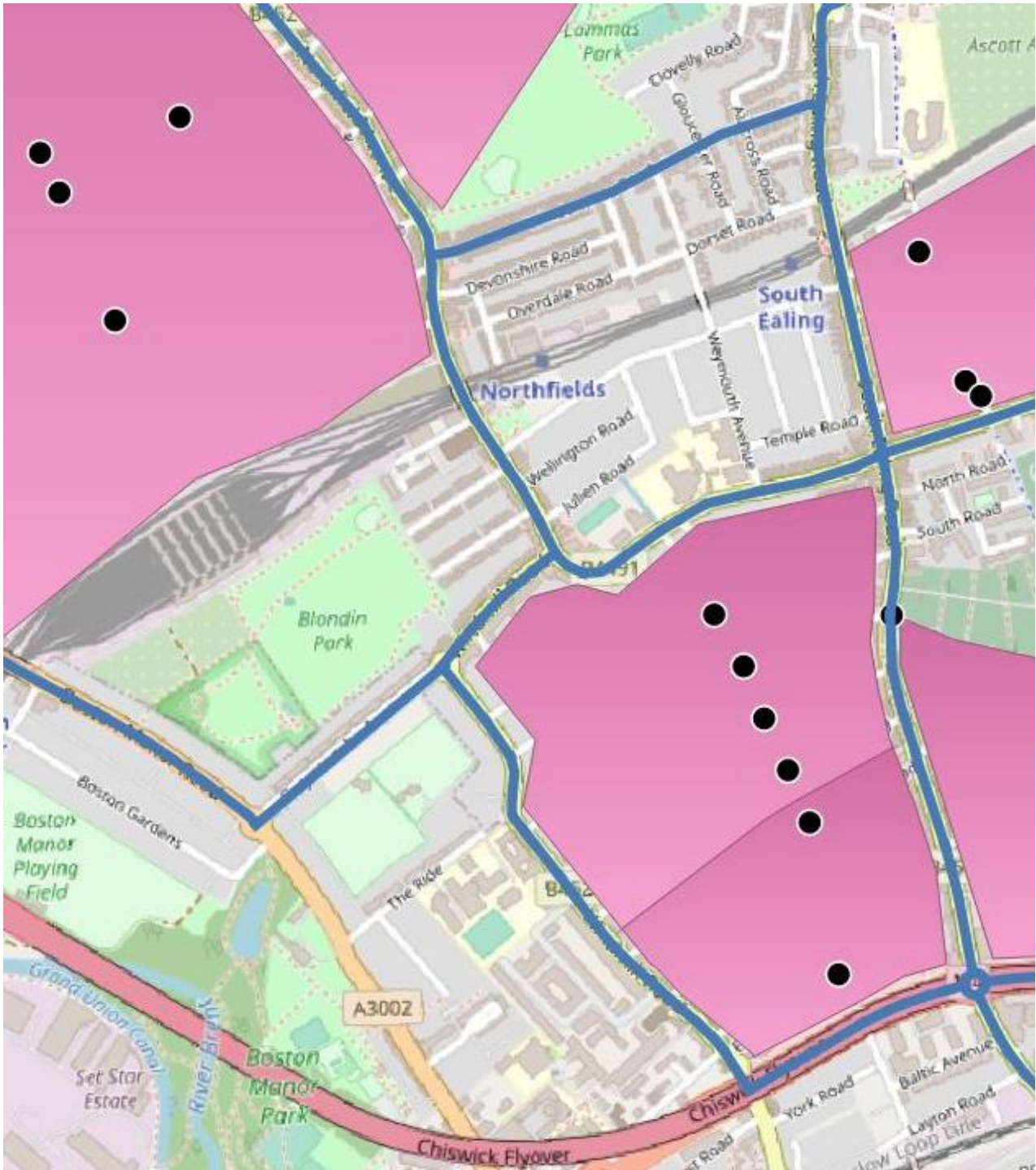
opposing schemes. This process led us to double-check modal filter locations and boundaries and adjust as necessary.

Identifying the locations of modal filters (e.g. bollards and camera gates) was in principle straightforward once information was gathered. Defining the boundaries of LTNs was more difficult. First, there was the question as to whether new modal filters meant that a new LTN existed or not. In some cases, one or two modal filters had been installed that did not appear to have an area-wide effect. For example, there were several examples in South London of isolated modal filters being used to create a quiet street next to a primary school – i.e. a permanent ‘School Street’ - but not a more comprehensive LTN. Similarly, in Central London there were several examples that affected a small standalone section of a shopping street. Hence, in a few cases, there were no LTNs corresponding to a modal filter or pair of filters, although we are still able to look at such areas through our modal filter proximity analysis. A total of 34 out of the 412 new modal filters were not, in our view, part of a new LTN.

We defined the boundaries of LTNs specifically for the purpose of this paper and hence not necessarily in line with areas shown in intervention maps drawn by districts. For this analysis, a ‘new LTN’ is that area in which we would expect the new modal filters installed between March and September 2020 to have reduced through motor traffic. Some districts included a wider area within their map, for instance including a larger new zone with reduced speed limits, or an adjacent area already impermeable to through motor traffic. We removed ‘boundary roads’ continuing to carry substantial through motor traffic from our spatial dataset of the extent of LTNs, and trimmed the LTN areas to exclude buildings facing onto those boundary roads. We generated a separate set of LTN boundary roads for analysis of differences between those living inside LTNs versus those living in adjacent boundary areas. An example of the spatial data is shown in Figure 1.

We learnt through this process that there is inevitably some subjectivity involved in defining LTN boundaries. Future research could explore other approaches to identifying such boundaries, for instance spatial analysis of (changes in) motor vehicle connectivity.

Figure 1: West London, showing modal filters (dots), LTN areas (pink), and boundary roads (blue)



4.3 Small-area demographic and social-economic information

The Greater London Authority is comprised of 25,053 Output Area (OAs), these being administrative areas containing around 300 people. The 2011 Census provided the number of individuals and households in each OA, plus information on age, ethnicity and disability for individuals, and on employment status and car/van availability for households. We also matched each OA to its 2019 overall deprivation rank from the Index of Multiple Deprivation, which is calculated at the Lower Super Output Area level (LSOA: there are around 5 OA per LSOA).

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Unfortunately, the most recent UK Census data is 10 years old. For car ownership, more recent data is available at the LSOA level from the Driver and Vehicle Licensing Agency. At the LSOA level, we found a 0.91 correlation between the proportion of households with a car in 2011 from Census data and the number of cars per capita in 2019 from DVLA data. This correlation was very similar between the 4,659 London LSOAs <50% inside an LTN ($r=0.91$) and the 176 $\geq 50\%$ inside an LTN ($r=0.93$). This provides reassurance that the Census data continues to provide a reasonable reflection of small-area car ownership in London. Note that in our analyses we prefer the older Census data to the DVLA data because the Census (a) is available at finer geographical resolution (OA not LSOA) and (b) provides a measure of car ownership at the household level, as opposed to just the total number of cars registered in an area.

We also compared the most recent 2019 version of the Index of Multiple Deprivation measure with the previous release in 2015. The 2015 release was largely created based on indicators collected in 2011-2012, i.e. from around the same time as the 2011 Census. We compared these two versions of the Index of Multiple Deprivation at the LSOA level using national rankings on the total deprivation score, where '1' corresponds to the most deprived LSOA in England. The correlation of these two measures was 0.98. The average change in deprivation rank between 2015 and 2019 was +1130 for LSOAs <50% inside an LTN and +1188 for LSOAs $\geq 50\%$ inside an LTN ($p=0.66$ for difference). There is thus no evidence that deprivation levels have been changing at a different rate since 2011 in areas that received LTNs versus the rest of London. This provides some further indirect support for the validity of making comparisons using Census 2011 data.

4.4 Defining LTN provision

Our primary measure of being provisioned with new active travel infrastructure was living inside an LTN. To operationalise this in terms of OA geography, we first calculated the proportion of buildings in each OA that lay inside a new LTN, using Ordnance Survey data on building boundaries. For each characteristic, in turn, we then multiplied the total OA population by the proportion of the OA's buildings inside the LTN. For example, if an OA contained 50 Black residents in total, and 80% of the OA lay inside the LTN, the estimated number of Black residents inside the LTN would be $50 * 0.8 = 40$. This analysis therefore used buildings as a proxy for population within an OA and assumed that demographic and socioeconomic characteristics were evenly distributed within OAs. The validity of these assumptions was supported by a sensitivity analysis that found a near-identical distribution of demographic and socioeconomic characteristics when focusing only on OAs 100% inside an LTN.

Our secondary measure was living within 500m of a new modal filter. This has the advantage of being more objective than our attempt to define LTN areas, and also includes people living near the 34 modal filters not part of an LTN. It is, however, a measure of proximity to interventions rather than of direct experience of living within an intervention area. For this measure, we calculated the route-based walking distance from the population-weighted centroid of each OA to the nearest modal filter using the routing service Graphhopper (graphhopper.com). We included 100% of residents of any OA that had a route-based walking distance $\leq 500\text{m}$ between the centroid and a new modal filter. While any cut-off is somewhat arbitrary, 500m is commonly used in literature as a walkable route network distance (e.g. Su et al., 2013).

For our second research question, we compared the characteristics of individuals living fully inside LTNs with the characteristics of neighbours in closely adjacent areas. Specifically, we compared individuals living in OAs 100% inside an LTN with individuals living in OAs that were 0% inside an LTN but that touched an LTN boundary road (with 'touching' defined using QGIS Vector tools). Note

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that these adjacent areas include people living on the boundary roads themselves, but also those living in neighbouring residential streets: this is a limitation of our use of area-level data.

4.5 Data analysis

For our first and second research questions we present results broken down into multiple demographic and socioeconomic characteristics. For our third, district-level research question we focus on binary comparisons by ethnicity (White versus Black, Asian, and Minority Ethnic, or BAME), disability (any versus none), and area deprivation (50% most deprived versus 50% least deprived). We chose these three binary comparisons *a priori* as reflecting dimensions of equity that have featured most prominently in the debate around LTNs. This use of binary comparisons allowed us to generate summary measures of equity according to these three dimensions within districts – for example, in a given district, comparing the proportion of White people provisioned with new infrastructure to the proportion of BAME people.

Because we are using total population data, extremely small differences can be statistically significant. We therefore focus on examining whether the data show what we see to be meaningful differences, such as an absolute difference of more than 2 percentage points, rather than testing for statistical significance.

5. Results

5.1 LTN development by district

Over seventy LTNs were implemented between March 2020 and September 2020 across London's 33 districts, involving the placement of 412 new modal filters.⁷ Figure 2 illustrates the pattern of LTN development by district of London. The extent of new LTNs implemented was highly unequal across districts, with some districts (e.g. Hackney, Islington, Lambeth, Ealing) delivering many schemes during this period, whereas a third of districts built little or nothing. More detail can be found in Appendix 1.

⁷ Specifically, we defined 84 separate LTN areas in our analysis, but this will not tally with official figures because, for instance, we count separately areas bisected by a boundary road even if they can be conceived of being the same LTN.

Figure 2: LTNs across London districts, implemented March-September 2020



5.2 How do the demographic and socioeconomic profile of Londoners receiving new infrastructure compare to Londoners who do not?

Table 1 presents the results at a London-wide level. We estimate that 3.7% of Londoners lived inside a new LTN as of October 2020, and 8.8% Londoners lived within 500m of any new modal filter.

The most pronounced demographic or socio-economic difference observed was related to deprivation. 5.1% of Londoners living in the 50% most deprived OAs lived in a new LTN, whereas this was true of only 1.9% of those living in the 25% least deprived OAs. In addition, 3.2% of people in car-owning households were inside a new LTN compared to 5.1% of people living in households without a car.

With respect to age, children and elderly people were slightly less likely to live in LTNs. In addition, Asian Londoners were less likely to live in a new LTN than White Londoners (2.9% vs 3.7%), whereas Black Londoners and people of Mixed or Other ethnicity were more likely to live in an LTN (5.1% and 4.2%, respectively). Overall, 3.7% of White and 3.9% of BAME Londoners lived in an LTN. There was very little difference by employment status or disability status.

This pattern of findings was almost identical in a sensitivity analysis focusing on the 2.1% of residents living inside OAs that were 100% within the boundaries of an LTN (Appendix 2). The results shown

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in Table 1 were also generally similar in analyses stratified between Inner and Outer London, except that Outer London showed smaller differences by ethnicity and deprivation (Appendix 2). Appendix 2 presents the equivalent to Table 1 for individual districts.

Table 1: Proportion of Londoners living in and near LTNs, by demographic and socioeconomic characteristics

		Number†	Inside a new LTN	Within 500m of a new modal filter
All		8173941	3.7%	8.8%
Age	0 to 4	591495	3.5%	8.4%
	5 to 17	1219899	3.4%	7.7%
	18 to 64	5457798	3.9%	9.4%
	65+	904749	3.2%	7.1%
Ethnicity	White	4879239	3.7%	8.7%
	Black	1088640	5.1%	11.6%
	Asian	1511546	2.9%	6.7%
	Mixed or other	694516	4.2%	10.1%
Disability	Not disabled	7016776	3.7%	8.9%
	Limited a little	605501	3.7%	8.4%
	Limited a lot	551664	3.9%	8.7%
Household car ownership	None	1357251	5.1%	12.5%
	1 or more cars	1908922	3.2%	7.3%
Household employment	Any employed adult	2345738	4.0%	9.6%
	No employed adult	920435	3.9%	9.1%
Area deprivation	Quarter 1 (least deprived)	1941076	1.9%	4.8%
	Quarter 2	2040925	2.6%	7.3%
	Quarter 3	2122020	5.1%	11.3%
	Quarter 4 (most deprived)	2069920	5.2%	11.6%

LTN = low traffic neighbourhood. †Number of people, except for car ownership and employment, where it is number of households. People of Gypsy or Traveller origin are included in the 'other' group in analyses of ethnicity. Deprivation quarters are defined relative to London.

5.3 Comparison of LTN residents with their neighbours in adjacent areas

Table 2 compares the characteristics of people living fully inside LTNs with people living in adjacent non-LTN areas that touch boundary roads. As with Table 1 above, the demographic and socioeconomic differences were generally modest. The proportion of children and older adults was slightly higher inside LTNs than in areas touching boundary roads, as was the proportion of disabled Londoners, Black Londoners, and households with no employed adults. The reverse was true for Asian Londoners and households with no car. There was no clear trend in area deprivation at this micro-level, with a slightly higher proportion of both the most and the least deprived quarters living inside LTNs than in adjacent areas.

All these differences were relatively small in absolute terms, with differences >2% observed only with respect to Asian ethnicity (Asian Londoners comprising a somewhat smaller proportion in LTNs than in adjacent areas) and some deprivation categories (individuals in the most and least deprived quarters comprising a somewhat larger proportion in LTNs than in adjacent areas). Our findings with respect to deprivation were almost identical in a sensitivity analysis that excluded 41 LSOAs straddling the boundary between LTNs and adjacent non-LTN areas (as this could artificially homogenise deprivation levels between the two areas): see Appendix 2.

Overall, Table 2 suggests that areas receiving LTNs are not more advantaged than adjacent areas. This is reassuring for planners, as it suggests there is not a systematic equity problem in this regard

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linked to the type of areas that have so far been made into LTNs. However, this does not necessarily mean that LTNs are always implemented equitably in practice across a district.

Table 2: Comparison of residents living inside an LTN versus those living in adjacent areas that touch a boundary road

		% living in areas fully inside LTN (N=172,006 individuals)	% living in adjacent non-LTN areas that touch boundary roads (N=322,263 individuals)
All		100%	100%
Age	0 to 4	7.0%	6.9%
	5 to 17	14.0%	12.7%
	18 to 64	69.6%	71.9%
	65+	9.5%	8.5%
Ethnicity	White	58.9%	56.6%
	Black	18.6%	17.1%
	Asian	13.4%	16.6%
	Mixed or other	9.1%	9.7%
Disability	Not disabled	85.7%	86.6%
	Limited a little	7.3%	7.0%
	Limited a lot	7.0%	6.4%
Household car ownership	None	52.7%	54.3%
	1 or more cars	47.3%	45.7%
Household employment	Any employed adult	72.1%	74.1%
	No employed adult	27.9%	25.9%
Area deprivation	Quarter 1 (least deprived)	13.5%	9.3%
	Quarter 2	18.1%	24.7%
	Quarter 3	34.2%	34.7%
	Quarter 4 (most deprived)	34.1%	31.4%

LTN = low traffic neighbourhood. Column percentages calculated with reference to the total number of individuals, except for car ownership and employment where they are calculated with reference to the total number of households

5.4 How does the equity of LTN implementation vary by district?

Of the 33 districts in London, ten implemented no new LTNs between March and September 2020, and a further two (Redbridge, Wandsworth) introduced them but removed them soon after. Among the remaining 21 districts, the proportion of residents covered by new LTNs ranged from 1% in Greenwich to 17% in Hackney, plus an outlier value of 55% in the very small City of London. In line with findings previously reported in Aldred & Verlinghieri (2020), the extent of new LTNs was highly correlated at the district level with lower car ownership (Pearson correlation=-0.66, $p < 0.001$, with the districts' number of cars per capita: See Appendix 3). It was also correlated with greater ethnic diversity (Pearson correlation=0.44, $p = 0.01$, with the proportion of BAME people in the district) and greater district-level deprivation (Spearman correlation=0.51, $p = 0.002$, with districts' mean deprivation rank).

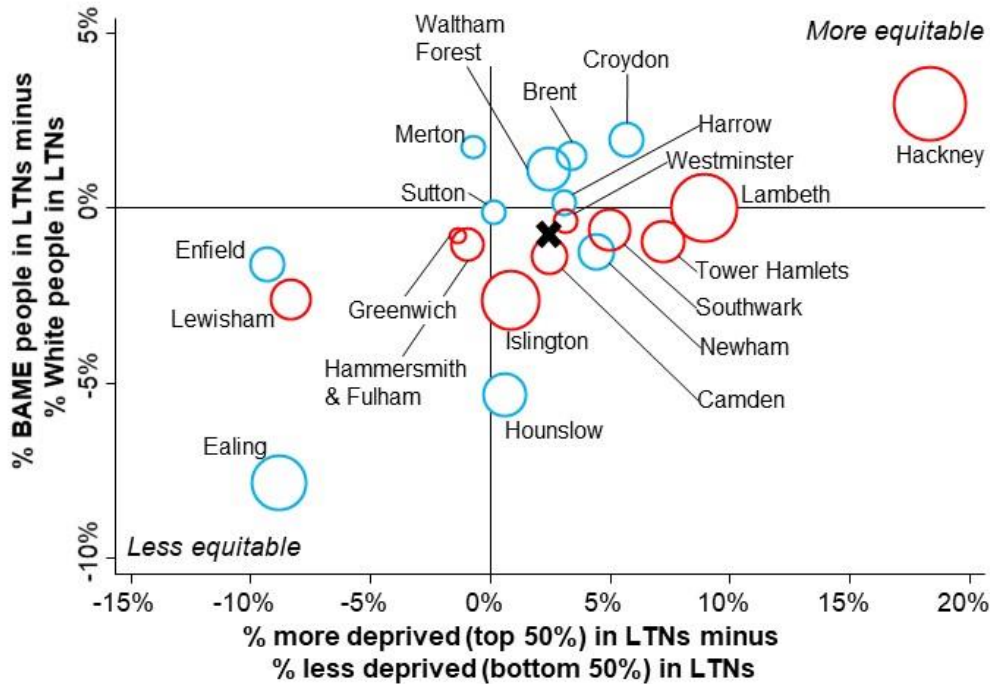
We next examined the equity of LTN implementation *within* districts with regard to ethnicity, disability and area deprivation. We found that disability showed little spatial variation within districts, and correspondingly there was little difference between the proportion of disabled versus non-disabled people living in LTNs (difference always <2% and usually <0.2%: see Appendix 3).

By contrast, we found larger differences with respect to ethnicity and area deprivation, as tabulated in Appendix 3 and shown graphically in Figure 3 and Figure 4. In these figures, each circle represents a district, with circle size reflecting the proportion of district inhabitants living in an LTN. Figure 3 shows absolute differences: the y-axis shows the absolute percentage point difference between the

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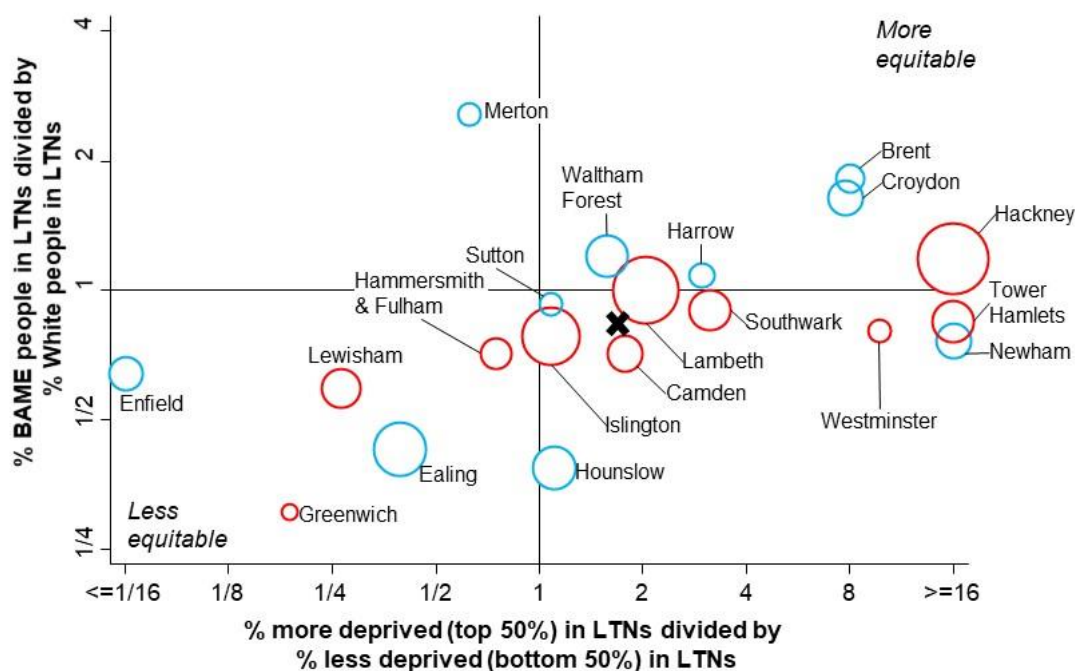
proportion of BAME individuals living in LTNs minus the proportion of White individuals. The x-axis shows the equivalent for area deprivation, 50% most deprived minus 50% least deprived. Figure 4 shows the equivalent for relative differences (ratios). The top-right quadrants labelled 'More equitable', therefore cover districts in which higher proportion of BAME people than White people live in LTNs, and a higher proportion of people from more deprived areas live in LTNs than people from less deprived areas. The black crosses show the median district values.

Figure 3: Absolute differences by ethnicity and area deprivation in which residents live inside LTNs, by district



BAME = Black, Asian and Minority Ethnic. LTN = low traffic neighbourhood. This graph excludes the City of London, which is very small, and also excludes 12 districts that did not introduce any LTNs. Each circle represents a district, with circle size proportional to the overall proportion of residents living in new LTNs. Outer London districts are marked in blue, inner London ones in red. The y-axis shows the absolute percentage point difference between the proportion of BAME individuals living in LTNs minus the proportion of White individuals. The x-axis shows the equivalent for deprivation. The black cross shows the median district value for these two variables. For a tabulation of these results, see Appendix 3.

Figure 4: Relative differences (ratios) by ethnicity and area deprivation in which residents live inside LTNs, by district



See footnotes to Figure 3

Figure 3 and Figure 4 demonstrate that there is considerable variation between districts in equity levels. On the one hand, there are districts where new LTNs have been concentrated in more diverse and deprived neighbourhoods. On the other hand, others have initially concentrated new LTNs in whiter and more affluent neighbourhoods. This wide variation in implementation practice was not associated with Outer versus Inner London status, with the size of the LTN program, with the average deprivation rank of the district, or with the proportion of district residents who were BAME (all $p > 0.1$ in Spearman correlations between these four variables and the deprivation difference (x-axis) or the ethnic difference (y-axis)).

London's devolved governance system means that equity at a pan-London and a micro-level can co-exist with a more mixed picture at the district-level. For deprivation, the pan-London difference between more versus less deprived areas was fairly similar to that of the typical district: +2.9% pan-London versus +2.4% district median, for the absolute difference between the proportion of people from more deprived areas who lived in LTNs minus the proportion of people from less deprived areas (see Appendix 3). This suggests that individual districts have tended on average to prioritise their more deprived areas, contributing to the equitable overall picture. For ethnicity, however, the pan-London results were slightly positive for ethnicity (+0.2 percentage point difference between the proportion of BAME people living in an LTN minus the proportion of White people), but the median district-level effect was slightly negative (-0.7%). This indicates that individual districts have not systematically been prioritising more ethnically diverse areas. Instead, the more equitable pan-London results with respect to ethnicity were driven by more ethnically diverse districts implementing more LTNs in total.

Both pan-London and in our adjacent area analysis, we had found different patterns for Black and Asian Londoners. Specifically, Black Londoners are more likely to live in LTNs than White Londoners, but Asian Londoners are less likely. Hence, we also compared at district level what proportion of Asian and White Londoners live in LTNs (Appendix, table 10), to explore to what extent there was consistency across districts. The median across all districts was a gap of -0.7% between

the proportion of White minus the proportion of Asian residents in LTNs. Of districts that had implemented LTNs, there was substantial variation. Asian residents were more likely than White residents to live in LTNs in three (maximum +2.1% in Merton), the groups were similar in eight, and Asians were less likely to live in LTNs in nine (maximum -9.1% in Ealing).

Finally, in this sub-section, we present Table 3 showing a different way of calculating equity in relation to area deprivation at the district level. This compares the average area deprivation percentile for those living inside versus outside LTNs, with the percentiles calculated relative to London as a whole and ranging from 0 (most affluent) to 1 (most deprived). While most district results are similar to that generated by the earlier metrics, for Hackney and Newham (which have relatively few affluent areas, none of which saw LTNs implemented) a highly positive picture in Figure 3 and Figure 4 becomes neutral in Table 3. Of the 20 London districts that implemented LTNs, Hackney and Newham are the two most homogenous with regard to area deprivation (as judged by the standard deviation of deprivation percentiles), making it somewhat harder for them to score highly on the Table 3 metric. By contrast districts with more variable levels of deprivation across the district have greater scope to score high or low: as exemplified by Enfield and Westminster, the two boroughs in Table 3 with the greatest internal variation in area deprivation levels.

Table 3: Alternative comparison of deprivation metrics by district: mean deprivation percentile inside versus outside LTNs

	A: mean deprivation percentile inside LTN	B: Mean deprivation percentile outside LTN	Difference A minus B
Enfield	24%	62%	-37%
Greenwich	32%	60%	-27%
Lewisham	48%	66%	-17%
Ealing	41%	55%	-14%
Hammersmith & Fulham	47%	53%	-6%
Sutton	25%	29%	-4%
Newham	70%	74%	-4%
Waltham Forest	59%	61%	-2%
Islington	66%	67%	-1%
Hounslow	52%	51%	0%
Hackney	80%	79%	2%
Lambeth	65%	62%	3%
Merton	35%	31%	4%
Camden	52%	47%	6%
Southwark	72%	63%	9%
Harrow	43%	32%	11%
Tower Hamlets	82%	68%	14%
Croydon	71%	51%	19%
Westminster	67%	46%	20%
Brent	81%	60%	20%

Deprivation percentiles are calculated by ranking each LSOA from 0 to 100 across London as a whole, with 100 corresponding to the highest level of deprivation.

6. Conclusions

We find that across London as a whole, new 2020 LTNs are clearly pro-equity in relation to area deprivation, and neutral to slightly positive in relation to ethnic diversity. Transport for London used equity criteria in its planning processes, unlike many authorities (Lee et al., 2017), and this may have helped improve outcomes. Micro-level equity is reasonably good, in that there do not seem to be

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large systemic differences between the demographic profile of those living in LTNs and those living in adjacent areas that touch boundary roads.

Having said this, within this broadly equitable picture there were some disparities. While overall BAME Londoners were slightly more likely than White Londoners to live in a new LTN (3.9% versus 3.7%), this varied by ethnic group. Among Black Londoners, 5.1% lived in a new LTN compared to 3.7% of White Londoners. However, Asian Londoners were slightly less likely than White Londoners to live in a new LTN (2.9% did, meaning they were -0.8% less likely than White Londoners to live in an LTN). Asian Londoners were also somewhat less likely to live inside an LTN than in an adjacent boundary area. These differences may reflect various factors, including the slightly higher proportion of Asians who live on a high street or main road compared to White or Black Londoners (10% versus 8-9%, see Aldred and Verlinghieri, 2020). These results might have been somewhat altered if LTNs had remained in place in Tooting within Wandsworth and/or in South Ilford within Redbridge, both neighbourhoods with large Asian populations. However, these two districts implemented but then removed their LTNs within the study period.

Some of the pan-London equity is due to a failure: the failure of several more affluent and more car-dependent districts to implement anything. By contrast, less affluent districts with lower car ownership were likely both more committed to the concept of LTNs and found them politically easier to implement. Twelve districts did not introduce any LTNs between March and September 2020 (or in two cases, introduced them but removed them soon after), so no resident in any group benefited there. As such, although we have focused in this paper on demographic and socioeconomic differences, arguably the largest inequality in London at the city level is the postcode lottery between districts. Among those districts that did introduce measures, we found that the 'typical' district was more likely to introduce LTNs in its more deprived areas but was also slightly more likely to favour its White residents. Both effects are relatively small, however, and mask very considerable variation between districts in both respects.

The reasons for this variation are not clear but may reflect variation across the capital in the political and policy processes that designed and implemented this first wave of LTNs. For example, Enfield initially introduced LTNs in areas that fitted a 'White, middle-class' profile, where local people had been strongly campaigning for LTNs. A key rationale for starting with these areas was that the surrounding main roads had previously received interventions such as new cycle tracks to which the LTNs could connect. Enfield is therefore an interesting example in highlighting the potential for competing legitimate considerations, including competing 'equity' considerations, in choosing LTN locations. Advantages of the selected areas in Enfield included good public engagement; creating a more coherent cycling network; and 'equity by road type' in the sense that that the boundary roads surrounding LTNs had themselves benefited from interventions. The selection did, however, mean that the initial distribution of LTNs across the district was not equitable with respect to demographic and socioeconomic equity – although Enfield's planned 2021 LTNs will substantially redress this by focusing on poorer parts of the district.

We are also aware that some districts initially implemented emergency measures based on schemes already under consultation before the Covid-19 pandemic. This is unsurprising given the very short timeframe (around 4 months) within which districts were expected to submit and then execute their plans, but may have meant that equity was less a consideration than expediency for the very first schemes. For example, Southwark implemented one of its first measures in the most affluent part of the district, based on schemes already under way in that area. By contrast, several of Southwark's most recent LTNs are being implemented with funding from the charitable arm of the local hospital

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trust in areas that have specifically been chosen on grounds of equity, including the presence of poor health indicators such as childhood obesity rates.

The LTNs implemented first may therefore often have been ones that happened to be easiest for districts to do quickly, rather than reflecting the nature of their fuller plans for further measures. It will be interesting to examine whether, as this implies, districts may converge somewhat over time as funding to implement further LTNs is made available. We recommend that as the LTN programme develops, the equity of the distribution of LTNs is monitored at both a city and district level, so that adjustments can be made as necessary. This is particularly important for those districts that our research identifies as having initially installed LTNs in less diverse and/or less deprived neighbourhoods; we would advise these districts to roll out further LTNs that place priority on rectifying this. The reasons for variations between districts would be a useful focus for future qualitative and quantitative research. Further research could also examine the extent to which LTNs improve active travel connectivity, by joining up what have been called 'low-stress' routes to destinations.

One of the limitations of this research is that it is only a snapshot of the first phase of LTN implementation in London. Another important limitation is our use of 2011 UK Census data; unfortunately, England only conducts a Census once every ten years. It is, however, reassuring that when we made comparisons between 2011 and more recent data for car ownership and deprivation, we found a high correlation over time and no differential change between LTN and non-LTN areas. A further limitation is our use of area-based metrics to compare individuals living fully inside an LTN with individuals living in adjacent areas. This prevented us from making a direct comparison between individuals actually living on boundary roads versus those on internal residential streets. We note, however, that our finding of relatively little difference between these two types of areas accords with previous evidence that there is generally little demographic or socio-economic difference between London residents living on main roads or high streets (which are more likely to be boundary roads) versus residential streets (more likely to be inside an LTN) (Aldred & Verlinghieri, 2020).

In conclusion, the first wave of LTNs in London has been broadly equitable across London as a whole, and also at the micro-level comparing residents within LTNs to their immediate neighbours. There is, however, considerable variation between districts in the extent to which they have introduced LTNs in a way that is equitable with regard to ethnicity and deprivation. Thus, while LTNs may have strong potential to improve equity of access to high-quality active travel infrastructure, our results suggest that this will not automatically happen everywhere. The same may be true for other contexts with devolved governance and is a reason to monitor district-level as well as overall equity. Finally, the district-led approach has left a third of London districts without any LTNs implemented during this period at all, these disproportionately being the most car-dependent and car-dominated districts, with lower public transport accessibility. This has particularly problematic implications for residents living on low incomes and without private vehicle access within these districts.

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Appendices

Appendix 1: additional methodological information

Defining LTNs, and details of LTNs by district

LTNs are controversial and during the period of study some measures were changed or removed. This principally involved LTNs in Redbridge and Wandsworth, where measures only lasted a matter of weeks before being removed by councillor decisions. Lewisham decided to substantially reduce its LTN, but it was still in place by the end of October, so it is included in this analysis. Conversely, districts such as Hackney introduced many more measures during October, but these are not included. The analysis here thus represents a snapshot and individual district results should be seen in this context: early high levels of (in)equity may have changed, for instance.

Another issue we faced was defining a ‘modal filter’. In the end, we included permanent filters, e.g. planters or lockable bollards; bus gates, which use Automatic Number Plate Recognition cameras to restrict motor traffic other than buses; and filters only operational for (substantial) parts of the day. Conversely, we did not include ‘School Streets’ where filters only operate during school opening and closing times and during the school term. One problem was whether to include the motor-vehicle restrictions in the district of Hammersmith and Fulham, which exempt all district residents and therefore substantially reduce the likely decline in motor traffic flow. While we feel that this is probably not within the spirit of an LTN, we have left it in for this analysis since it was introduced as part of the wider London ‘StreetSpace’ programme.

Table 4: Summary of LTN development by district

District	New LTNs (measures introduced between March-September 2020, and in place by the end of October 2020).
City of London	While not referring to LTNs, City of London has been implementing an ambitious programme of motor traffic reduction, including bus-bike corridors on major arteries and modal filtering in smaller streets.
Barking and Dagenham	No new LTNs as of September 2020.
Barnet	No new LTNs as of September 2020.
Bexley	No new LTNs as of September 2020.
Brent	In Summer 2020, Brent began implementing LTNs, initially in Stonebridge and Harlesden, and Wembley Central. More are planned.
Bromley	No new LTNs as of September 2020.
Camden	Camden implemented LTN schemes around Camden Town, Gospel Oak, and Gray’s Inn, and modal filtering around Covent Garden.

Croydon	Croydon implemented LTN schemes in Norwood and Broad Green.
Ealing	A series of LTNs implemented mostly to the South of the district, around the border with Hounslow (one is a combined scheme).
Enfield	Two LTNs in the South-West of the district.
Greenwich	A small amount of modal filtering in the North-West of the district.
Hackney	Hackney has a long-standing programme of modal filtering to reduce through traffic from neighbourhoods and continued this across the district. Since September 2020, more have been introduced, and the district plans to introduce them everywhere longer-term.
Hammersmith and Fulham	Hammersmith and Fulham introduced one 'traffic scheme' in SW6. This differs from other LTNs in allowing through all district residents and taxis. It is likely to have less of an impact in reducing through traffic than other LTNs.
Haringey	No new LTNs as of September 2020.
Harrow	Harrow introduced several small LTNs in the centre of the district.
Havering	No new LTNs as of September 2020.
Hillingdon	No new LTNs as of September 2020.
Hounslow	Hounslow has introduced LTNs around the areas of Chiswick and Isleworth, as well as at the district boundary with Ealing.
Islington	Islington has rolled out a number of LTNs, so far, most around the South of the district, and plans more.
Kensington and Chelsea	No new LTNs as of September 2020.
Kingston upon Thames	Kingston has introduced several modal filters at various points in the district to reduce through motor traffic; however, we have not drawn them as 'LTNs' as they are separate filters in different neighbourhoods.
Lambeth	Lambeth have introduced LTNs across the centre of the district, as well as one in the North near Oval.
Lewisham	Lewisham introduced one LTN in Lee Green; they then announced plans to roll this back, but as of the time of writing it remained in place and so is included on the map.

Merton	In September, Merton introduced three small LTNs in the East of the district, with more introduced since.
Newham	Newham has implemented one larger LTN around the Wanstead/Stratford area, in partnership with Waltham Forest (the LTN straddles the border).
Redbridge	Redbridge introduced two LTNs towards the West of the district, but removed them after just over a month after vocal opposition from a group of residents.
Richmond upon Thames	Richmond introduced one modal filter towards the West of the district.
Southwark	Southwark constructed one larger LTN in Walworth in the north of the district, and have implemented several smaller schemes in Dulwich.
Sutton	Sutton have created two LTN areas in Central Sutton and implemented a number of modal filters separately elsewhere in the district.
Tower Hamlets	A larger LTN was implemented to the North-West of the district, by the Hackney border. This formed part of a Liveable Neighbourhood scheme and includes the modal filtering of a B road, with the creation of new pocket parks.
Waltham Forest	Waltham Forest have, like Hackney, a number of longer-standing schemes, in this case more recent via the Mini-Holland programme. Between March and September, they implemented additional schemes in several areas that had not yet been treated in this way.
Wandsworth	Wandsworth introduced LTNs around the Tooting area. Despite initial evidence of the LTNs reducing local traffic and boosting numbers of cyclists, they were removed after only a few weeks following complaints ⁸ .
Westminster	Westminster did not build anything specifically called an 'LTN'; however, restrictions on motor traffic entry in some parts of Soho and Covent Garden (often with the aim of supporting businesses such as restaurants in those areas) have here been included as LTNs, as in Camden.

⁸ Wandsworth Borough Council 2020. Paper no. 20-337. Available from: <https://democracy.wandsworth.gov.uk/documents/s77681/20.337%20Transport%20Action%20Plan.pdf>.

Appendix 2: Who lives in new LTNs? Sensitivity analysis for pan-London results, plus results stratified by Inner/Outer London and district

Note: We do not present district level tables for City of London, which is very small, or for 11 districts where <1% of the population was covered by new measures. These districts are nonetheless included in our analyses of Inner and Outer London as a whole.

Table 5: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: SENSITIVITY ANALYSIS, WHOLE OF LONDON

		Number†	Inside LTN	Inside LTN, in output areas 100% inside LTNs	Within 500m of a modal filter
All		8173941	3.7%	1.8%	8.8%
Age	0 to 4	591495	3.5%	1.7%	8.4%
	5 to 17	1219899	3.4%	1.7%	7.7%
	18 to 64	5457798	3.9%	1.9%	9.4%
	65+	904749	3.2%	1.5%	7.1%
Ethnicity	White	4879239	3.7%	1.8%	8.7%
	Black	1088640	5.1%	2.5%	11.6%
	Asian	1511546	2.9%	1.3%	6.7%
	Mixed or other	694516	4.2%	1.9%	10.1%
Disability	Not disabled	7016776	3.7%	1.8%	8.9%
	Limited a little	605501	3.7%	1.8%	8.4%
	Limited a lot	551664	3.9%	1.9%	8.7%
Household car ownership	None	1357251	5.1%	2.4%	12.5%
	1 or more cars	1908922	3.2%	1.5%	7.3%
Household employment	Any employed adult	2345738	4.0%	1.9%	9.6%
	No employed adult	920435	3.9%	1.9%	9.1%
Area deprivation	Quarter 1 (least deprived)	1941076	1.9%	1.0%	4.8%
	Quarter 2	2040925	2.6%	1.3%	7.3%
	Quarter 3	2122020	5.1%	2.4%	11.3%
	Quarter 4 (most deprived)	2069920	5.2%	2.4%	11.6%

LTN = low traffic neighbourhood. †Number of people, except for car ownership and employment, where it is number of households. People of Gypsy or Traveller origin are included in the 'other' group in analyses of ethnicity. Deprivation quarters defined relative to London.

Table 6: Comparison of residents living inside an LTN versus those living in adjacent areas that touch a boundary road, restricted to output areas in LSOAs that are either fully inside or fully outside

		% living in areas fully inside LTN (N=129,194 individuals)	% living in adjacent non-LTN areas that touch boundary roads (N=213,603 individuals)
All		100%	100%
Age	0 to 4	7.0%	6.9%
	5 to 17	13.8%	12.7%
	18 to 64	69.9%	71.9%
	65+	9.3%	8.5%
Ethnicity	White	59.4%	56.7%
	Black	18.2%	17.0%
	Asian	13.3%	16.6%
	Mixed or other	9.1%	9.7%
Disability	Not disabled	85.8%	86.7%
	Limited a little	7.3%	7.0%
	Limited a lot	6.9%	6.4%
Household car ownership	None	52.2%	54.1%
	1 or more cars	47.8%	45.9%
Household employment	Any employed adult	72.6%	74.2%
	No employed adult	27.4%	25.8%
Area deprivation	Quarter 1 (least deprived)	14.0%	9.1%
	Quarter 2	18.9%	25.9%
	Quarter 3	34.9%	34.3%
	Quarter 4 (most deprived)	32.2%	30.6%

LTN = low traffic neighbourhood. †Number of people, except for car ownership and employment, where it is number of households. People of Gypsy or Traveller origin are included in the 'other' group in analyses of ethnicity. Deprivation quarters defined relative to London.

Table 7.1: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: INNER LONDON

		Number	Inside LTN	Within 500m of a modal filter
All		2923548	6.2%	15.5%
Age	0 to 4	203357	5.6%	14.0%
	5 to 17	379283	6.1%	14.3%
	18 to 64	2080175	6.3%	15.9%
	65+	260733	6.1%	14.6%
Ethnicity	White	1765999	6.2%	15.4%
	Black	480750	7.4%	17.4%
	Asian	387042	5.1%	13.2%
	Mixed or other	289757	6.1%	15.7%
Disability	Not disabled	2524999	6.2%	15.4%
	Limited a little	202445	6.6%	15.8%
	Limited a lot	196104	6.6%	15.8%
Household car ownership	None	710695	6.9%	17.7%
	1 or more cars	550693	5.7%	13.6%
Household employment	Any employed adult	914588	6.3%	15.9%
	No employed adult	346800	6.5%	16.1%
Area deprivation	Quarter 1 (least deprived)	417872	1.8%	7.0%
	Quarter 2	684321	4.1%	13.2%
	Quarter 3	839443	7.9%	18.6%
	Quarter 4 (most deprived)	981912	8.2%	18.0%

See notes to Table 5

Table 7.2: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: OUTER LONDON

		Number	Inside LTN	Within 500m of a modal filter
All		5250393	2.4%	5.1%
Age	0 to 4	388138	2.4%	5.4%
	5 to 17	840616	2.2%	4.7%
	18 to 64	3377623	2.5%	5.4%
	65+	644016	2.0%	4.1%
Ethnicity	White	3113240	2.2%	4.8%
	Black	607890	3.3%	7.0%
	Asian	1124504	2.1%	4.5%
	Mixed or other	404759	2.8%	6.1%
Disability	Not disabled	4491777	2.4%	5.2%
	Limited a little	403056	2.2%	4.7%
	Limited a lot	355560	2.3%	4.8%
Household car ownership	None	646556	3.0%	6.7%
	1 or more cars	1358229	2.1%	4.7%
Household employment	Any employed adult	1431150	2.5%	5.6%
	No employed adult	573635	2.3%	4.8%
Area deprivation	Quarter 1 (least deprived)	1523204	2.0%	4.2%
	Quarter 2	1356604	1.8%	4.2%
	Quarter 3	1282577	3.2%	6.4%
	Quarter 4 (most deprived)	1088008	2.6%	5.8%

See notes to Table 5

Table 7.3: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: BRENT

		Number	Inside LTN	Within 500m of a modal filter
All		311215	2.8%	5.0%
Age	0 to 4	22446	2.9%	5.9%
	5 to 17	47918	3.0%	5.5%
	18 to 64	208175	2.7%	4.9%
	65+	32676	2.6%	4.3%
Ethnicity	White	112560	1.8%	3.7%
	Black	58632	5.1%	9.0%
	Asian	105986	2.5%	4.1%
	Mixed or other	34037	2.7%	5.2%
Disability	Not disabled	266333	2.7%	4.9%
	Limited a little	23213	2.9%	5.2%
	Limited a lot	21669	3.4%	6.0%
Household car ownership	None	47419	3.4%	6.9%
	1 or more cars	62867	2.3%	3.9%
Household employment	Any employed adult	80437	2.6%	4.8%
	No employed adult	29849	3.3%	6.3%
Area deprivation	Quarter 1 (least deprived)	17007	0.0%	0.0%
	Quarter 2	84743	0.6%	0.6%
	Quarter 3	114721	2.4%	2.9%
	Quarter 4 (most deprived)	94744	5.6%	12.5%

See notes to Table 5

Table 7.4: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: CAMDEN

		Number	Inside LTN	Within 500m of a modal filter
All		220338	4.3%	19.6%
Age	0 to 4	13168	3.7%	16.7%
	5 to 17	25837	4.3%	18.5%
	18 to 64	157356	4.4%	20.3%
	65+	23977	4.1%	17.5%
Ethnicity	White	145888	4.8%	19.7%
	Black	18060	3.6%	19.9%
	Asian	35446	2.9%	19.4%
	Mixed or other	20944	4.1%	18.6%
Disability	Not disabled	188507	4.3%	19.3%
	Limited a little	16300	4.3%	21.2%
	Limited a lot	15531	4.4%	21.6%
Household car ownership	None	59595	4.4%	21.5%
	1 or more cars	37939	4.3%	16.5%
Household employment	Any employed adult	68880	4.5%	19.5%
	No employed adult	28654	3.9%	19.8%
Area deprivation	Quarter 1 (least deprived)	56816	2.7%	5.1%
	Quarter 2	62502	3.6%	17.6%
	Quarter 3	52110	8.0%	36.5%
	Quarter 4 (most deprived)	48910	3.1%	20.9%

See notes to Table 5

Table 7.5: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: CROYDON

		Number	Inside LTN	Within 500m of a modal filter
All		363378	3.9%	12.6%
Age	0 to 4	27972	4.7%	15.0%
	5 to 17	61072	4.0%	12.3%
	18 to 64	229959	4.0%	13.1%
	65+	44375	3.1%	8.7%
Ethnicity	White	199961	3.0%	9.5%
	Black	73256	6.3%	18.7%
	Asian	59627	3.5%	13.8%
	Mixed or other	30534	4.9%	15.7%
Disability	Not disabled	310265	3.9%	12.7%
	Limited a little	28733	3.8%	11.5%
	Limited a lot	24380	4.1%	12.3%
Household car ownership	None	48523	5.8%	18.4%
	1 or more cars	96487	3.5%	10.9%
Household employment	Any employed adult	103494	4.2%	13.5%
	No employed adult	41516	4.5%	13.2%
Area deprivation	Quarter 1 (least deprived)	81098	0.0%	1.6%
	Quarter 2	84447	1.6%	8.5%
	Quarter 3	100567	6.9%	19.8%
	Quarter 4 (most deprived)	97266	6.1%	17.8%

See notes to Table 5

Table 7.6: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: EALING

		Number	Inside LTN	Within 500m of a modal filter
All		338449	9.7%	16.1%
Age	0 to 4	25426	9.7%	16.3%
	5 to 17	51179	8.4%	14.0%
	18 to 64	225617	9.9%	16.7%
	65+	36227	9.8%	15.4%
Ethnicity	White	165518	13.7%	21.9%
	Black	36860	6.9%	12.6%
	Asian	100439	4.6%	8.2%
	Mixed or other	35632	8.3%	14.9%
Disability	Not disabled	290670	9.8%	16.4%
	Limited a little	24894	8.8%	14.6%
	Limited a lot	22885	8.9%	14.0%
Household car ownership	None	43847	10.9%	19.1%
	1 or more cars	80235	10.4%	17.2%
Household employment	Any employed adult	91191	11.0%	18.3%
	No employed adult	32891	9.7%	16.6%
Area deprivation	Quarter 1 (least deprived)	50400	24.1%	34.3%
	Quarter 2	100256	9.8%	14.7%
	Quarter 3	108055	3.6%	11.4%
	Quarter 4 (most deprived)	79738	8.6%	12.9%

See notes to Table 5

Table 7.7: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: ENFIELD

		Number	Inside LTN	Within 500m of a modal filter
All		312466	3.8%	5.9%
Age	0 to 4	24513	3.0%	4.6%
	5 to 17	54035	2.9%	4.3%
	18 to 64	195085	4.1%	6.5%
	65+	38833	3.8%	5.6%
Ethnicity	White	190296	4.4%	6.8%
	Black	53687	1.2%	2.3%
	Asian	34893	4.7%	6.6%
	Mixed or other	33590	3.4%	5.7%
Disability	Not disabled	264487	3.9%	6.0%
	Limited a little	25297	3.2%	5.2%
	Limited a lot	22682	3.2%	4.9%
Household car ownership	None	38933	3.2%	5.8%
	1 or more cars	80983	4.1%	6.2%
Household employment	Any employed adult	81155	4.4%	7.0%
	No employed adult	38761	2.6%	4.2%
Area deprivation	Quarter 1 (least deprived)	57229	11.9%	14.4%
	Quarter 2	61355	7.3%	13.4%
	Quarter 3	67309	0.6%	2.9%
	Quarter 4 (most deprived)	126573	0.0%	0.0%

See notes to Table 5

Table 7.8: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: GREENWICH

		Number	Inside LTN	Within 500m of a modal filter
All		254557	0.8%	7.1%
Age	0 to 4	20945	0.8%	6.5%
	5 to 17	40427	0.6%	5.3%
	18 to 64	167069	0.8%	7.5%
	65+	26116	1.2%	7.4%
Ethnicity	White	158572	1.1%	8.7%
	Black	48655	0.2%	3.6%
	Asian	29894	0.3%	4.6%
	Mixed or other	17436	0.7%	7.1%
Disability	Not disabled	216123	0.9%	7.2%
	Limited a little	19417	0.7%	6.4%
	Limited a lot	19017	0.6%	6.2%
Household car ownership	None	42455	0.8%	8.4%
	1 or more cars	58590	1.0%	7.5%
Household employment	Any employed adult	70369	1.0%	8.4%
	No employed adult	30676	0.8%	6.9%
Area deprivation	Quarter 1 (least deprived)	24317	5.3%	17.0%
	Quarter 2	68610	0.4%	7.2%
	Quarter 3	82181	0.6%	7.7%
	Quarter 4 (most deprived)	79449	0.0%	3.3%

See notes to Table 5

Table 7.9: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: HACKNEY

		Number	Inside LTN	Within 500m of a modal filter
All		246270	17.4%	34.0%
Age	0 to 4	19149	15.3%	29.6%
	5 to 17	37246	16.4%	30.2%
	18 to 64	172480	17.7%	35.4%
	65+	17395	18.5%	33.2%
Ethnicity	White	134143	16.0%	32.7%
	Black	56858	20.7%	37.0%
	Asian	25867	17.9%	35.7%
	Mixed or other	29402	16.5%	33.1%
Disability	Not disabled	210586	17.1%	34.1%
	Limited a little	17620	18.7%	34.0%
	Limited a lot	18064	18.8%	33.8%
Household car ownership	None	65721	17.8%	36.4%
	1 or more cars	35969	18.2%	34.2%
Household employment	Any employed adult	71763	17.5%	35.8%
	No employed adult	29927	18.9%	35.1%
Area deprivation	Quarter 1 (least deprived)	0		
	Quarter 2	13304	0.0%	18.7%
	Quarter 3	75095	17.7%	29.9%
	Quarter 4 (most deprived)	157871	18.6%	37.3%

See notes to Table 5

Table 7.10: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: HAMMERSMITH & FULHAM

		Number	Inside LTN	Within 500m of a modal filter
All		182493	3.3%	7.6%
Age	0 to 4	11900	3.2%	8.2%
	5 to 17	20613	3.1%	8.1%
	18 to 64	133567	3.4%	7.6%
	65+	16413	3.4%	7.3%
Ethnicity	White	124005	3.7%	8.4%
	Black	21505	2.6%	5.4%
	Asian	16635	2.5%	6.3%
	Mixed or other	20348	2.7%	6.2%
Disability	Not disabled	159535	3.3%	7.7%
	Limited a little	11485	3.2%	6.8%
	Limited a lot	11473	3.5%	6.9%
Household car ownership	None	44524	2.8%	6.3%
	1 or more cars	36066	3.9%	8.6%
Household employment	Any employed adult	59398	3.3%	7.4%
	No employed adult	21192	3.2%	7.0%
Area deprivation	Quarter 1 (least deprived)	31180	0.6%	7.2%
	Quarter 2	57344	5.5%	12.2%
	Quarter 3	44999	6.0%	7.5%
	Quarter 4 (most deprived)	48970	0.0%	2.7%

See notes to Table 5

Table 7.11: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: HARROW

		Number	Inside LTN	Within 500m of a modal filter
All		239056	2.0%	3.4%
Age	0 to 4	15916	2.0%	3.4%
	5 to 17	38746	1.9%	3.2%
	18 to 64	150727	2.1%	3.5%
	65+	33667	1.7%	3.1%
Ethnicity	White	100810	1.9%	3.7%
	Black	19708	2.4%	3.4%
	Asian	101808	2.0%	3.0%
	Mixed or other	16730	2.4%	3.6%
Disability	Not disabled	204202	2.0%	3.4%
	Limited a little	18687	1.9%	3.4%
	Limited a lot	16167	2.0%	3.2%
Household car ownership	None	19811	2.5%	3.6%
	1 or more cars	64457	1.9%	3.4%
Household employment	Any employed adult	61805	2.1%	3.5%
	No employed adult	22463	1.9%	3.3%
Area deprivation	Quarter 1 (least deprived)	86999	1.8%	5.1%
	Quarter 2	115259	1.4%	1.8%
	Quarter 3	25639	6.6%	6.3%
	Quarter 4 (most deprived)	11159	0.0%	0.0%

See notes to Table 5

Table 7.12: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: HOUNSLOW

		Number	Inside LTN	Within 500m of a modal filter
All		253957	6.1%	12.5%
Age	0 to 4	19725	6.2%	12.4%
	5 to 17	37762	5.9%	11.2%
	18 to 64	169611	6.1%	12.8%
	65+	26859	6.5%	12.6%
Ethnicity	White	130322	8.7%	17.5%
	Black	16813	6.9%	13.8%
	Asian	87257	1.9%	4.7%
	Mixed or other	19565	6.8%	13.5%
Disability	Not disabled	218954	6.1%	12.6%
	Limited a little	18600	6.0%	11.8%
	Limited a lot	16403	6.2%	11.9%
Household car ownership	None	29985	7.9%	16.6%
	1 or more cars	64917	6.5%	13.7%
Household employment	Any employed adult	70529	6.8%	14.6%
	No employed adult	24373	7.5%	14.5%
Area deprivation	Quarter 1 (least deprived)	30451	18.4%	35.1%
	Quarter 2	95067	1.8%	8.6%
	Quarter 3	91286	3.4%	5.7%
	Quarter 4 (most deprived)	37153	13.6%	20.9%

See notes to Table 5

Table 7.13: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: ISLINGTON

		Number	Inside LTN	Within 500m of a modal filter
All		206125	11.1%	24.6%
Age	0 to 4	12289	11.3%	22.8%
	5 to 17	24096	11.4%	21.9%
	18 to 64	151704	10.9%	25.1%
	65+	18036	12.9%	25.2%
Ethnicity	White	140352	12.0%	25.8%
	Black	26294	9.1%	19.3%
	Asian	19034	8.5%	25.6%
	Mixed or other	20445	10.5%	22.4%
Disability	Not disabled	173854	11.1%	24.8%
	Limited a little	15729	11.9%	24.0%
	Limited a lot	16542	11.4%	23.1%
Household car ownership	None	60485	11.1%	26.3%
	1 or more cars	33071	12.5%	24.2%
Household employment	Any employed adult	65311	11.5%	25.5%
	No employed adult	28245	11.9%	25.8%
Area deprivation	Quarter 1 (least deprived)	2527	0.0%	0.0%
	Quarter 2	47646	11.1%	25.7%
	Quarter 3	72881	12.7%	33.2%
	Quarter 4 (most deprived)	83071	10.2%	17.2%

See notes to Table 5

Table 7.14: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: KINGSTON UPON THAMES

		Number	Inside LTN	Within 500m of a modal filter
All		160060	0%	4.9%
Age	0 to 4	10964	0%	5.4%
	5 to 17	22728	0%	3.9%
	18 to 64	106010	0%	5.1%
	65+	20358	0%	4.5%
Ethnicity	White	119124	0%	5.3%
	Black	4021	0%	5.1%
	Asian	26152	0%	2.8%
	Mixed or other	10763	0%	4.9%
Disability	Not disabled	140158	0%	4.9%
	Limited a little	11297	0%	4.6%
	Limited a lot	8605	0%	5.0%
Household car ownership	None	15997	0%	6.4%
	1 or more cars	47642	0%	5.0%
Household employment	Any employed adult	47199	0%	5.4%
	No employed adult	16440	0%	5.0%
Area deprivation	Quarter 1 (least deprived)	99809	0%	5.9%
	Quarter 2	52228	0%	2.7%
	Quarter 3	4705	0%	0.0%
	Quarter 4 (most deprived)	3318	0%	16.2%

See notes to Table 5

Table 7.15: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: LAMBETH

		Number	Inside LTN	Within 500m of a modal filter
All		303086	14.9%	24.9%
Age	0 to 4	20701	13.4%	21.6%
	5 to 17	39661	14.2%	23.4%
	18 to 64	219537	15.2%	25.7%
	65+	23187	14.3%	22.9%
Ethnicity	White	172830	14.8%	25.0%
	Black	78542	15.5%	25.9%
	Asian	20938	11.8%	19.8%
	Mixed or other	30776	15.3%	25.3%
Disability	Not disabled	264415	14.9%	25.0%
	Limited a little	20053	14.4%	24.3%
	Limited a lot	18618	14.8%	24.6%
Household car ownership	None	75214	15.5%	27.5%
	1 or more cars	54803	14.1%	22.2%
Household employment	Any employed adult	97219	15.1%	25.6%
	No employed adult	32798	14.5%	24.4%
Area deprivation	Quarter 1 (least deprived)	9767	0.0%	0.0%
	Quarter 2	79168	9.6%	15.2%
	Quarter 3	114811	18.2%	29.7%
	Quarter 4 (most deprived)	99340	16.7%	29.5%

See notes to Table 5

Table 7.16: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: LEWISHAM

		Number	Inside LTN	Within 500m of a modal filter
All		275885	5.2%	13.3%
Age	0 to 4	22004	5.1%	12.6%
	5 to 17	41503	4.5%	11.8%
	18 to 64	186243	5.2%	13.7%
	65+	26135	6.1%	13.2%
Ethnicity	White	147478	6.4%	15.0%
	Black	74942	3.1%	10.3%
	Asian	25534	5.3%	13.6%
	Mixed or other	27931	4.3%	12.1%
Disability	Not disabled	236150	5.2%	13.4%
	Limited a little	20212	5.1%	13.4%
	Limited a lot	19523	4.8%	12.4%
Household car ownership	None	55893	4.6%	13.3%
	1 or more cars	60198	6.0%	14.0%
Household employment	Any employed adult	83529	5.5%	14.1%
	No employed adult	32562	4.9%	12.6%
Area deprivation	Quarter 1 (least deprived)	13188	14.5%	20.1%
	Quarter 2	58070	10.7%	17.0%
	Quarter 3	98979	3.2%	13.1%
	Quarter 4 (most deprived)	105648	2.8%	10.6%

See notes to Table 5

Table 7.17: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: MERTON

		Number	Inside LTN	Within 500m of a modal filter
All		199693	1.7%	4.0%
Age	0 to 4	14830	1.6%	4.1%
	5 to 17	28441	1.6%	4.4%
	18 to 64	133300	1.8%	4.1%
	65+	23122	1.7%	3.4%
Ethnicity	White	129390	1.1%	2.6%
	Black	20811	3.1%	7.9%
	Asian	36143	3.1%	6.8%
	Mixed or other	13349	1.9%	5.0%
Disability	Not disabled	174461	1.7%	4.0%
	Limited a little	13993	2.2%	4.4%
	Limited a lot	11239	1.6%	3.7%
Household car ownership	None	25644	1.7%	3.7%
	1 or more cars	53113	1.5%	3.6%
Household employment	Any employed adult	59940	1.6%	3.7%
	No employed adult	18817	1.4%	3.4%
Area deprivation	Quarter 1 (least deprived)	97795	1.3%	1.6%
	Quarter 2	53596	3.0%	8.5%
	Quarter 3	34456	0.6%	2.8%
	Quarter 4 (most deprived)	13846	2.6%	7.1%

See notes to Table 5

Table 7.18: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: NEWHAM

		Number	Inside LTN	Within 500m of a modal filter
All		307984	4.3%	6.4%
Age	0 to 4	25384	3.6%	5.6%
	5 to 17	52444	4.1%	5.8%
	18 to 64	209563	4.3%	6.6%
	65+	20593	4.7%	6.8%
Ethnicity	White	88754	5.1%	7.8%
	Black	60256	6.0%	8.5%
	Asian	133895	2.8%	4.3%
	Mixed or other	25079	4.7%	7.4%
Disability	Not disabled	265273	4.3%	6.4%
	Limited a little	21148	4.2%	6.1%
	Limited a lot	21563	4.2%	6.3%
Household car ownership	None	52849	4.8%	7.5%
	1 or more cars	48670	4.3%	6.4%
Household employment	Any employed adult	72800	4.6%	7.1%
	No employed adult	28719	4.5%	6.6%
Area deprivation	Quarter 1 (least deprived)	1522	0.0%	0.0%
	Quarter 2	10808	0.0%	0.0%
	Quarter 3	160820	6.5%	10.1%
	Quarter 4 (most deprived)	134834	2.0%	2.6%

See notes to Table 5

Table 7.19: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: SOUTHWARK

		Number	Inside LTN	Within 500m of a modal filter
All		288283	5.9%	22.5%
Age	0 to 4	20739	5.0%	23.9%
	5 to 17	38299	5.5%	23.7%
	18 to 64	206916	6.0%	21.9%
	65+	22329	6.1%	24.4%
Ethnicity	White	156086	6.2%	21.7%
	Black	77511	5.4%	25.2%
	Asian	27192	5.6%	19.2%
	Mixed or other	27494	5.9%	23.0%
Disability	Not disabled	249303	5.8%	22.3%
	Limited a little	20002	6.5%	23.9%
	Limited a lot	18978	6.1%	23.9%
Household car ownership	None	70312	6.8%	23.2%
	1 or more cars	50110	5.0%	21.3%
Household employment	Any employed adult	88351	5.9%	22.0%
	No employed adult	32071	6.4%	23.7%
Area deprivation	Quarter 1 (least deprived)	27316	0.7%	16.0%
	Quarter 2	56187	3.1%	22.6%
	Quarter 3	89818	6.0%	20.5%
	Quarter 4 (most deprived)	114962	8.4%	25.6%

See notes to Table 5

Table 7.20: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: SUTTON

		Number	Inside LTN	Within 500m of a modal filter
All		190146	1.7%	10.2%
Age	0 to 4	12750	1.6%	11.0%
	5 to 17	30335	1.5%	10.0%
	18 to 64	119828	1.6%	10.4%
	65+	27233	2.4%	9.2%
Ethnicity	White	149256	1.7%	10.5%
	Black	9120	1.8%	8.4%
	Asian	22035	1.5%	9.2%
	Mixed or other	9735	1.9%	9.8%
Disability	Not disabled	162957	1.7%	10.3%
	Limited a little	15067	2.2%	10.1%
	Limited a lot	12122	2.1%	9.0%
Household car ownership	None	18303	2.1%	9.7%
	1 or more cars	59871	1.7%	10.3%
Household employment	Any employed adult	56608	1.7%	10.5%
	No employed adult	21566	2.3%	9.1%
Area deprivation	Quarter 1 (least deprived)	110354	2.3%	11.7%
	Quarter 2	40329	0.1%	7.4%
	Quarter 3	23009	2.8%	8.9%
	Quarter 4 (most deprived)	16454	0.5%	9.3%

See notes to Table 5

Table 7.21: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: TOWER HAMLETS

		Number	Inside LTN	Within 500m of a modal filter
All		254096	5.8%	10.4%
Age	0 to 4	18750	4.9%	8.0%
	5 to 17	36346	6.0%	9.2%
	18 to 64	183430	5.7%	10.8%
	65+	15570	7.4%	11.6%
Ethnicity	White	114644	6.3%	12.0%
	Black	18629	5.4%	9.2%
	Asian	104501	5.3%	8.7%
	Mixed or other	16322	6.0%	11.2%
Disability	Not disabled	219793	5.6%	10.3%
	Limited a little	17045	6.6%	11.0%
	Limited a lot	17258	7.1%	11.4%
Household car ownership	None	63797	6.3%	12.3%
	1 or more cars	37460	4.8%	8.5%
Household employment	Any employed adult	73934	5.4%	10.8%
	No employed adult	27323	6.7%	11.1%
Area deprivation	Quarter 1 (least deprived)	16725	0.0%	0.0%
	Quarter 2	32856	0.0%	5.0%
	Quarter 3	80328	6.1%	12.6%
	Quarter 4 (most deprived)	124187	7.9%	11.8%

See notes to Table 5

Table 7.22: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: WALTHAM FOREST

		Number	Inside LTN	Within 500m of a modal filter
All		258249	6.0%	13.0%
Age	0 to 4	20839	6.6%	13.8%
	5 to 17	40513	6.0%	12.4%
	18 to 64	171331	6.2%	13.5%
	65+	25566	4.7%	10.2%
Ethnicity	White	134430	5.5%	11.5%
	Black	44791	6.6%	14.4%
	Asian	54389	6.9%	15.5%
	Mixed or other	24639	5.9%	13.6%
Disability	Not disabled	220621	6.1%	13.1%
	Limited a little	19744	6.0%	12.6%
	Limited a lot	17884	5.8%	12.6%
Household car ownership	None	40583	6.8%	15.7%
	1 or more cars	56278	5.4%	11.1%
Household employment	Any employed adult	69582	6.3%	13.5%
	No employed adult	27279	5.3%	11.9%
Area deprivation	Quarter 1 (least deprived)	8342	0.0%	0.0%
	Quarter 2	64465	4.8%	7.8%
	Quarter 3	120028	9.1%	15.8%
	Quarter 4 (most deprived)	65414	2.3%	14.9%

See notes to Table 5

Table 7.23: Proportion of Londoners living near different types of modal filter interventions, by demographic and socioeconomic characteristics: WESTMINSTER

		Number	Inside LTN	Within 500m of a modal filter
All		219396	1.8%	14.9%
Age	0 to 4	12617	0.9%	11.4%
	5 to 17	23341	0.9%	9.1%
	18 to 64	158924	2.0%	16.2%
	65+	24514	1.7%	14.0%
Ethnicity	White	135254	1.9%	15.8%
	Black	16472	0.8%	7.7%
	Asian	31862	2.4%	15.1%
	Mixed or other	35808	1.1%	14.6%
Disability	Not disabled	188517	1.8%	15.3%
	Limited a little	15553	1.8%	12.6%
	Limited a lot	15326	1.7%	11.9%
Household car ownership	None	66531	2.7%	18.0%
	1 or more cars	39241	1.0%	13.5%
Household employment	Any employed adult	73736	2.1%	16.6%
	No employed adult	32036	2.0%	15.7%
Area deprivation	Quarter 1 (least deprived)	74693	0.4%	13.2%
	Quarter 2	46664	0.4%	28.6%
	Quarter 3	45504	3.3%	10.5%
	Quarter 4 (most deprived)	52535	3.6%	9.0%

See notes to Table 5

Appendix 3: Comparisons of LTN implementation according to area deprivation and ethnicity, by district

Table 8: LTN implementation and other characteristics, by district

District	% Residents living in new LTNs	Population (1000s)	Inner London?	Mean district deprivation percentile	% BAME among district residents	No. cars per 1000 residents
Barking and Dagenham	0%	186	No	80%	42%	306
Barnet	0%	356	No	35%	36%	406
Bexley	0%	232	No	35%	18%	468
Brent	3%	311	No	61%	64%	282
Bromley	0%	309	No	29%	16%	497
Camden	4%	220	Yes	47%	34%	211
City of London	55%	7	Yes	29%	21%	229
Croydon	4%	363	No	52%	45%	385
Ealing	10%	338	No	54%	51%	333
Enfield	4%	312	No	60%	39%	383
Greenwich	1%	255	Yes	59%	38%	307
Hackney	17%	246	Yes	79%	46%	170
Hammersmith & Fulham	3%	182	Yes	53%	32%	240
Haringey	0%	255	No	65%	40%	241
Harrow	2%	239	No	33%	58%	420
Havering	0%	237	No	37%	12%	496
Hillingdon	0%	274	No	41%	40%	447
Hounslow	6%	254	No	51%	49%	370
Islington	11%	206	Yes	67%	32%	187
Kensington and Chelsea	0%	159	Yes	49%	29%	281
Kingston upon Thames	0%	160	No	22%	26%	440
Lambeth	15%	303	Yes	63%	43%	220
Lewisham	5%	276	Yes	65%	47%	277
Merton	2%	200	No	31%	35%	364
Newham	4%	308	No	73%	71%	198
Redbridge	0%	279	No	39%	58%	381
Richmond upon Thames	0%	187	No	16%	14%	454
Southwark	6%	288	Yes	63%	46%	210
Sutton	2%	190	No	29%	22%	480
Tower Hamlets	6%	254	Yes	69%	55%	172
Waltham Forest	6%	258	No	61%	48%	295
Wandsworth	0%	307	Yes	37%	29%	292
Westminster	2%	219	Yes	47%	38%	222
Spearman correlation (p-value) with % residents living in a new LTN	-	0.11 (p=0.54)	0.42 (p=0.02)	0.51 (p=0.002)	0.44 (p=0.01)	-0.66 (p<0.001)

BAME = Black, Asian and Minority Ethnic. LTN = low traffic neighbourhood. Deprivation percentiles are calculated by ranking each LSOA from 0 to 100, with 100 corresponding to the highest level of deprivation.

Table 9: Equity analysis: proportion of residents inside an LTN, by ethnicity, small area deprivation and disability

	Ethnicity				Deprivation				Disability			
	White [A]	BAME [B]	Difference [B]-[A]	Ratio [B]/[A]	Least deprived 50% [C]	Most deprived 50% [D]	Difference [D]-[C]	Ratio [D]/[C]	Not disabled [E]	Disabled [F]	Difference [F]-[E]	Ratio [F]/[E]
All London	3.7%	3.9%	0.2%	1.06	2.3%	5.1%	2.9%	2.25	3.7%	3.8%	0.0%	1.01
All Inner London	6.2%	6.3%	0.1%	1.02	3.3%	8.0%	4.8%	2.47	6.2%	6.6%	0.4%	1.07
All Outer London	2.2%	2.6%	0.4%	1.16	1.9%	2.9%	1.0%	1.52	2.4%	2.3%	-0.1%	0.96
Brent	1.8%	3.3%	1.5%	1.83	0.5%	3.9%	3.4%	8.04	2.7%	3.1%	0.5%	1.17
Camden	4.8%	3.4%	-1.4%	0.71	3.2%	5.6%	2.4%	1.77	4.3%	4.4%	0.1%	1.01
Croydon	3.0%	5.0%	2.0%	1.64	0.8%	6.5%	5.7%	7.77	3.9%	4.0%	0.0%	1.01
Ealing	13.7%	5.8%	-7.8%	0.43	14.6%	5.7%	-8.9%	0.39	9.8%	8.8%	-1.0%	0.90
Enfield	4.4%	2.8%	-1.6%	0.64	9.5%	0.2%	-9.3%	0.02	3.9%	3.2%	-0.6%	0.84
Greenwich	1.1%	0.3%	-0.8%	0.31	1.7%	0.3%	-1.4%	0.19	0.9%	0.6%	-0.2%	0.73
Hackney	16.0%	19.0%	3.0%	1.19	0.0%	18.3%	18.3%	Inf	17.1%	18.7%	1.6%	1.09
Hammersmith & Fulham	3.7%	2.6%	-1.0%	0.71	3.8%	2.9%	-1.0%	0.75	3.3%	3.3%	0.0%	1.00
Harrow	1.9%	2.1%	0.2%	1.09	1.6%	4.6%	3.1%	2.96	2.0%	2.0%	-0.1%	0.96
Hounslow	8.7%	3.4%	-5.3%	0.39	5.8%	6.4%	0.6%	1.10	6.1%	6.1%	0.0%	1.01
Islington	12.0%	9.4%	-2.6%	0.78	10.5%	11.4%	0.8%	1.08	11.1%	11.6%	0.6%	1.05
Lambeth	14.8%	14.9%	0.0%	1.00	8.6%	17.5%	8.9%	2.04	14.9%	14.6%	-0.3%	0.98
Lewisham	6.4%	3.8%	-2.6%	0.59	11.4%	3.0%	-8.4%	0.27	5.2%	5.0%	-0.2%	0.95
Merton	1.1%	2.9%	1.8%	2.58	1.9%	1.2%	-0.7%	0.62	1.7%	1.9%	0.2%	1.13
Newham	5.1%	3.9%	-1.2%	0.76	0.0%	4.4%	4.4%	Inf	4.3%	4.2%	0.0%	0.99
Southwark	6.2%	5.5%	-0.6%	0.90	2.3%	7.3%	5.0%	3.12	5.8%	6.3%	0.5%	1.09
Sutton	1.7%	1.6%	-0.1%	0.93	1.7%	1.8%	0.1%	1.08	1.7%	2.1%	0.5%	1.29
Tower Hamlets	6.3%	5.4%	-1.0%	0.85	0.0%	7.2%	7.2%	Inf	5.6%	6.9%	1.2%	1.22
Waltham Forest	5.5%	6.6%	1.1%	1.20	4.3%	6.7%	2.4%	1.57	6.1%	5.9%	-0.1%	0.98
Westminster	1.9%	1.5%	-0.4%	0.80	0.4%	3.5%	3.1%	9.72	1.8%	1.7%	0.0%	0.98
District median			-0.7%	0.83			2.4%	1.67			0.0%	1.01

BAME = Black, Asian and Minority Ethnic. LTN = low traffic neighbourhood. Deprivation categorised relative to London as a whole. In 12 districts none of the population is covered by an LTN. These 12 districts are included in the All London/Inner London/Outer London analyses, but not presented separately in the district-level analysis. The City of London is also excluded from district-level analyses, as it is a very small district. Figure 3 in the main report plots the 'Difference' column for ethnicity against the 'Difference' column for deprivation. Figure 4 in the main report plots the 'Ratio' column for ethnicity against the 'Ratio' column for deprivation. The 'district median' value at the bottom gives the median value for individual districts on the difference measures.

Table 10: Equity analysis: proportion of residents inside an LTN, by Asian vs White ethnicity

	Asian Ethnicity			
	White [A]	Asian [B]	Difference [B]-[A]	Ratio [B]/[A]
All London	3.7%	2.9%	-0.8%	0.79
All Inner London	6.2%	5.1%	-1.1%	0.83
All Outer London	2.2%	2.1%	-0.1%	0.95
Brent	1.8%	2.5%	0.7%	1.39
Camden	4.8%	2.9%	-1.9%	0.60
Croydon	3.0%	3.5%	0.4%	1.15
Ealing	13.7%	4.6%	-9.1%	0.33
Enfield	4.4%	4.7%	0.3%	1.08
Greenwich	1.1%	0.3%	-0.8%	0.26
Hackney	16.0%	17.9%	1.9%	1.12
Hammersmith & Fulham	3.7%	2.5%	-1.2%	0.68
Harrow	1.9%	2.0%	0.1%	1.03
Hounslow	8.7%	1.9%	-6.8%	0.22
Islington	12.0%	8.5%	-3.5%	0.71
Lambeth	14.8%	11.7%	-3.1%	0.79
Lewisham	6.4%	5.3%	-1.0%	0.84
Merton	1.1%	3.1%	2.0%	2.77
Newham	5.1%	2.8%	-2.3%	0.54
Southwark	6.2%	5.6%	-0.6%	0.90
Sutton	1.7%	1.5%	-0.3%	0.84
Tower Hamlets	6.3%	5.3%	-1.1%	0.83
Waltham Forest	5.5%	6.9%	1.4%	1.26
Westminster	1.9%	2.4%	0.5%	1.28
District median			-0.7%	0.84

LTN = low traffic neighbourhood. In 12 districts none of the population is covered by an LTN. These 12 districts are included in the All London/Inner London/Outer London analyses, but not presented separately in the district-level analysis. The City of London is also excluded from district-level analyses, as it is a very small district.