Gender differences in active travel in major cities across the world

Rahul Goel[*,1], Oyinlola Oyebode[3], Louise Foley[2], Lambed Tatah[2], Christopher Millett[4], James Woodcock[2]

*corresponding author rahulatiitd@gmail.com

[1]Transportation Research and Injury Prevention Centre, Indian Institute of Technology Delhi, India

[2]MRC Epidemiology Unit, University of Cambridge, UK

[3]Warwick Medical School, University of Warwick, UK

[4]School of Public Health, Imperial College London, UK

Gender differences in active travel in major cities across the world

ABSTRACT

There is lack of literature on international comparison of gender differences in the use of active travel modes. We used population-representative travel surveys for 19 major cities across 13 countries and 6 continents, representing a mix of cites from low-and-middle income (n=8) and high-income countries (n=11). In all the cities, females are more likely than males to walk and, in most cities, more likely to use public transport. This relationship reverses in cycling, with females often less likely users than males. In high cycling cities, both genders are equally likely to cycle. Active travel to access public transport contributes 30-50% of total active travel time. The gender differences in active travel metrics are age dependent. Among children (<16 years), these metrics are often equal for girls and boys, while gender disparity increases with age. On average, active travel enables one in every four people in the population to achieve at least 30 minutes of physical activity in a day, though there is large variation across the cities. In general, females are more likely to achieve this level than males. The results highlight the importance of a gendered approach towards active transport policies. Such an approach necessitates reducing road traffic danger and male violence, as well as overcoming social norms that restrict women from cycling.

Keywords: Active travel, physical activity, walking, cycling, public transportation, gender, age

1 INTRODUCTION

Walking and cycling are physical activities that can be incorporated in daily lives. People who engage in active travel tend to be more physically active (Roth et al., 2012; Sahlqvist et al., 2012). Physical activity reduces all-cause mortality and multiple chronic disease outcomes such as cardiovascular diseases, diabetes, and cancers (Bull et al., 2020; Pedersen & Saltin, 2015; Warburton & Bredin, 2017). Thus, widespread use of active travel across the population is beneficial for public health.

Walking and cycling can be for the whole journey or to access public transport. Studies have reported that use of public transportation is a significant contributor to physical activity (Rissel et al., 2012). A significant proportion of public transportation users chieve 30-minutes-a-day of physical activity (Besser & Dannenberg, 2005; Patterson et al., 2019). They are also many times more likely to achieve 10,000 steps in a day compared to users of private motorised modes (Villanueva et al., 2008; Wener & Evans, 2007). The level of activity may also vary by the type of public transportation. For example, train use leads to a much higher level of activity than the bus (Morency et al., 2011).

Daily mobility in a population is highly gendered (Alessandretti et al., 2020; Law, 2002; Peters, 2011). Average travel behaviour of women differs on from men in locations visited, trip purpose, trip distance, and mode of transport (Alessandretti et al., 2020; Gauvin et al., 2020; Goel et al., 2021; Law, 2002; Ravensbergen et al., 2019). These differences result from space-time constraints, such as childcare and household tasks that fall disproportionately on women, that are also related to differences in employment levels (Kwan, 2000; Peters, 2011). Women are also more sensitive to traffic risk resulting in gender differences in the use of active travel (Aldred et al., 2017; Garrard et al., 2008a). Further, there are gender norms, cultural barriers, and fear of sexual harassment and assault by men that deter women from using certain modes of transport or travel at certain times of day (Iqbal et al., 2020; Phadke, 2013). It is often while walking or cycling, or using public transport, when women feel most vulnerable during travel (Gekoski et al., 2017), thus making active travel for women a potential source of anxiety.

Given that gender inequalities vary across countries, it is likely that the gender gap, in both mobility generally and active travel specifically, varies greatly across the world. Althoff et al. (2020) used smartphone accelerometery data for ~100 countries and found large variation in gender inequality in walking (measured as daily number of steps). The highest gender inequality was reported for Qatar, Saudi Arabia, and Malaysia and the lowest in Sweden, Ukraine, and Russia. The study also concluded that population-wide activity inequality could be greatly reduced through increases in female activity alone. The study by Althoff and other such large-scale global studies, though useful to highlight gender gaps and its variation across the globe, often lack details such as the modes of transport that individuals use to attain their activity levels. There are very few studies that compared travel activity levels across a large range of countries especially a mix of low-and-middle and high-income countries. In this study we aim to address this gap in literature. Using travel surveys, we present active travel patterns for 19 cities across 13 countries located across 6 continents. We aim to answer the following research questions:

1. What are the gender differences across the cities in terms of use of active modes of transport for all trips and for trips to work?
2. What are the gender differences in active travel time and relative contributions of modes of transport to active travel time?
3. What are the gender differences in the proportion of the population achieving 30 minutes of physical activity from active travel?

The following includes the section on method that provide details of the datasets used, as well as the analysis conducted. This is followed by a section on results. Next, we present discussion and conclusions of the paper.

2 METHOD

To answer these research questions, we used population-representative household travel surveys for 19 cities from 13 different countries in five different continents (**Table 1**). An exception is Accra in Ghana, where the dataset used is a time-use activity survey from which travel-related activities have been extracted, as trips. We selected the settings based on data availability and to ensure representation of different regions of the world. The included countries represent a wide range of income levels. For example, India and Kenya had a per-capita income of less than US $2000 in 2015, Brazil and South Africa between US $6000 and US $10000, and on the other extreme, Switzerland and the USA, higher than US $60,000. Among the countries listed, seven are low-and-middle income and the rest are high income. The latter include Australia, Chile, USA, and all five European countries. The details of travel surveys are presented in the **Supplementary Material.**

Table 1: List of cities included in the analysis ordered by the region

City	Country	Region	Stage-level data*
Accra	Ghana	Africa	No
Kisumu	Kenya	Africa	No
Cape Town	South Africa	Africa	No
Delhi	India	Asia	All information
Melbourne	Australia	Australia	All information
London	England	Europe	All information
Berlin	Germany	Europe	No
Cologne	Germany	Europe	No
Hamburg	Germany	Europe	No
Munich	Germany	Europe	No
Zurich	Switzerland	Europe	All information
Buenos Aires	Argentina	Latin	No
Sao Paulo	Brazil	Latin	Only walking
Santiago	Chile	Latin	No
Bogota	Colombia	Latin	Only walking
Mexico City	Mexico	Latin	All information
Chicago	USA	North	All information
Los Angeles	USA	North	All information
New York City	USA	North	All information

*travel survey includes stages within a trip

Travel survey datasets include demographic and socio-economic details of the individuals among the sampled households, and their travel diary on a given day, consisting of trips and corresponding stages. Within a trip, a stage is completed when a transfer is made from one mode to another. For example, a bus trip usually consists of three stages, with first stage of walking to bus stop, second stage of travelling by bus, and third stage of walking from bus stop to destination. Travel surveys often assign a date to the sampled households for which they report

their travel activities in a diary format. In some surveys that involve face-to-face interviews of the respondents, respondents are asked to recall travel activities of the previous day. As a result, in travel surveys, there are individuals who report no travel activity, as is possible for a variety of reasons. This day for which respondents report their travel activities is referred to as 'travel day'.

For this analysis, our focus is the use of active travel modes i.e. walking and cycling, and their contribution to population-level activity levels. Active modes of transport can be used to travel the whole trip, or one or more stages of a trip, for example, walking to public transport access points or to the parking lot. The ideal travel survey dataset for our analysis is when mode of transport and travel time are reported for each stage within a trip. Among the 19 cities, the datasets differ in reporting this detail. For some cities, all the required information is reported for the stages (Chicago, Delhi, London, Los Angeles, Melbourne, Mexico City, New York City, Zurich). For some, duration of total walking, done for part(s) of the trips, is reported for each trip (Sao Paulo and Bogota). In Buenos Aires, mode of travel for each of the stages is known, but duration of those stages is not. For some, stage-level data is not reported for any trip (Accra, Cape Town, Kisumu, Berlin, Hamburg, Munich, Cologne). In total there are 10 cities with data on stage-level active travel and 9 without it (see Table 1). We highlight these differences while presenting the results.

As many trips are multimodal in nature, 'main mode' of a trip is typically defined as the one with which a stage with the longest duration has been travelled. Some datasets reported main mode of transport for all trips. For the cities where it was not reported, we used the stage-level duration data to identify main mode. For cities, where stage-level data was reported, but no travel time (e.g. Buenos Aires), we used a hierarchy[1] of travel modes that is often used for identifying main modes. For example, in a trip involving car and train, the latter is assumed as the main mode, and the car as an access mode. We defined work trips as those for which trip purpose or destination type was reported as work or work-related. For some datasets, the subsequent trip returning home was already classified as a work trip. For datasets, where these were not, we classified them as work trips. Given the diversity of cities represented in our dataset, we have a large range of modes of transport. We classified all the public transport modes into three categories— bus, metro, and train. We refer to shared taxis, trams, and dial-a-ride/para-transit as bus, as all these are road-based public transport modes. Metro includes metro trains and subways. Cycle rickshaws were categorised as 'other'. We present results for three modes, two active travel modes— walk and bike, and one which usually involves some active travel time— public transport.

[1] Train>Metro>Bus>Taxi>Car>Motorcycle>bicycle>walking

Following the research questions (RQ) mentioned above, we present five metrics of active travel use. These include mode share of all trips and for work trips (RQ 1), level of immobility (RQ 2) and active travel time per capita (RQ 2), percentage contribution of active travel time by main modes (RQ 2), and percentage of individuals achieving 30 minutes or more of daily active travel time (RQ 3). Mode share is calculated as the percentage share of trips by the main mode of travel. Level of immobility is the percentage of individuals who reported not going out of home on travel day, which could result from sickness, disability, voluntary decision to stay at home, or underreporting by survey respondents (Madre et al., 2007). Active travel time per capita is the total walking and cycling duration across all stages/trips divided by the total number of sampled individuals, including those who reported no travel. We classified population-wide active travel time into respective main mode categories, and express this as percentage share of total active travel time contributed by these modes. We present all results stratified by gender and four age groups—children (0-15 years), working age (16-60 years), older adults (>60 years), and all age combined. Only for reporting mode share of trips to work, we do not classify results by age groups.

Among the metrics described above, active travel time per capita, percentage share of active travel time contributed by the main modes, and percent individuals attaining ≥30 minutes of active travel time on their travel day suffer from inconsistency of stage-level data, which presents a challenge in comparing these metrics across the settings. For cities where stage-level data is not reported, this leads to underestimation of active travel that individuals engage in as part of public transport trips. Therefore, we developed the following method to harmonise these metrics across the cities. We calculated gender-specific trip-level average active travel time for all main modes (except walking and cycling) for each of the 10 cities where stage-level data is available. The averages were calculated for the following modes—bus, metro, train, taxi, car, and motorcycle. In some cities, one or more of these modes are not available. We calculated the median of those averages from 10 cities (**Supplementary Material**). Next, we multiplied these median values by the total number of trips of the respective main modes, for the set of cities where this data is not available. We refer to estimates derived using this calculation as 'harmonised' and for the 10 cities as 'reported'. Using this method, we can harmonise the metrics of active travel time per capita and percentage share of active travel time, but not the metric of percent individuals attaining ≥30 minutes of active travel, as the latter needs harmonisation at the individual level. For this third metric, we only present data for the 10 cities. For sensitivity analysis, we used another approach in which cities were divided into three homogenous groups based on their income levels. Next, we assigned stage-level active travel time to cities from the average of the cities in their corresponding group. Within group 1, we used Bogota, Mexico City and

Sao Paulo to approximate stage-level active travel time for Buenos Aires, Cape Town, and Santiago. In group 2, we used Delhi for Accra and Kisumu. In group 3 we used London and Zurich for the four German cities. For all calculations, we used survey weights reported in the datasets for representative estimates.

3 RESULTS

3.1 Level of immobility by gender and age

Figure 1 presents the level of immobility for all age groups combined. The results for age-stratified analysis for this metric and all others are presented in **Supplementary Material**. In the cities, level of immobility is greater among females than males, with exceptions of Kisumu and Los Angeles, where the two are equal. On average, females have 4 percentage points higher level of immobility than males (26% and 22%, respectively). This difference is greatest in Delhi (26 percentage points), followed by Accra (12 percentage points) and Sao Paulo (9 percentage points). The gender difference in immobility varies across the age groups. The average divergence between the two groups is the highest among the older adults (8 percentage points higher for women), followed by working age group (5 percentage points higher for women), while among the children, girls have slightly lower level of immobility (less than one percentage point) than boys.

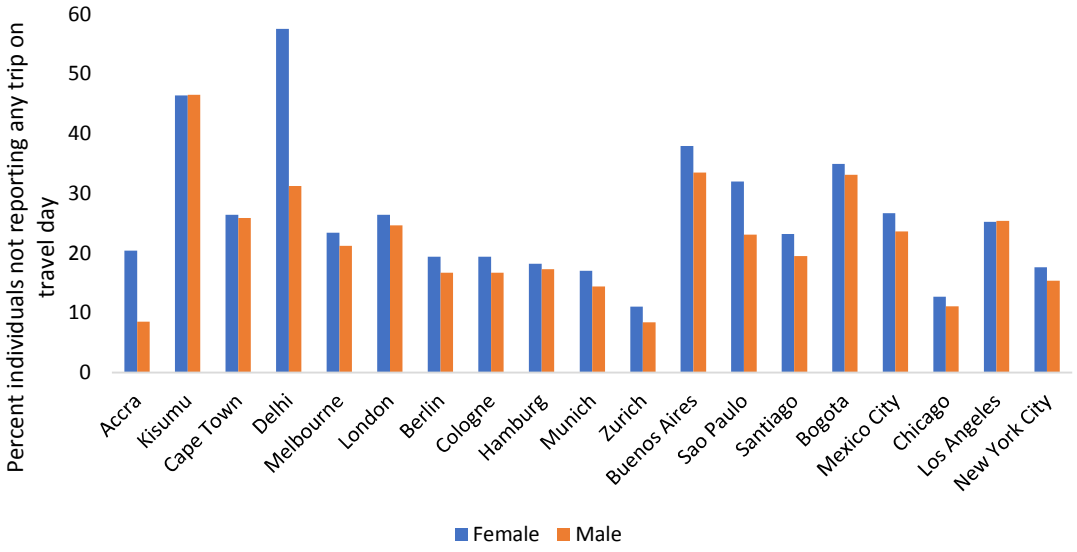

Figure 1: Level of immobility by gender for all age groups combined

3.2 Mode shares for all trips

In **Table 2** we present percentage share of all trips with walking, cycling, and public transport as main modes for all age groups combined. Note that the three proportions do not sum to 100 as there are also other modes of

transport, for which the results are presented in **Supplementary Material**. Of the three modes of transport presented, walking is most common across the cities, followed closely by public transport. In comparison, cycling is used for a small minority of trips within most cities. There are, however, significant variations in mode share across the cities. Highest levels of walking are in Accra, Delhi, and Kisumu, with an average of 59% among females and 45% among males, and the lowest levels are in Chicago, Los Angeles, and Melbourne (average 14% and 13% for females and males, respectively). In all the cities, females have higher likelihood to walk and, on an average, this likelihood is 23% greater than that of men (calculated as the average of the ratios of the mode share of females to males). Among the three age groups, children have the highest levels of walking, and working age group and older adults have slightly lower but similar levels of walking. Gender difference in walking is the lowest among children, highest among working age group, and slightly lower than working age group among the older adults.

Table 2: Mode shares for all trips by gender and for all age groups combined (colour coding for two gender groups combined and specific to a mode)

City	Country	Region	Walking (%)		Cycling (%)		Public Transport (%)	
			Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	60.6	56.4	0.1	0.8	28.0	23.6
Kisumu	Kenya	Africa	50.5	38.3	2.1	7.0	23.5	24.1
Cape Town	South Africa	Africa	30.2	29.2	0.1	0.4	32.8	27.3
Delhi	India	Asia	66.2	39.9	1.1	6.9	17.3	24.0
Melbourne	Australia	Australia	17.0	16.3	1.2	2.3	8.8	8.8
London	England	Europe	33.7	29.3	1.3	4.0	27.4	27.2
Berlin	Germany	Europe	26.8	24.1	15.0	13.2	23.7	19.7
Cologne	Germany	Europe	26.0	22.9	14.4	15.0	14.4	13.7
Hamburg	Germany	Europe	26.9	23.1	13.9	13.4	18.8	17.7
Munich	Germany	Europe	23.4	21.6	16.8	15.8	21.9	19.1
Zurich	Switzerland	Europe	37.1	32.1	5.7	6.9	17.7	14.5
Buenos Aires	Argentina	Latin America	32.1	22.3	2.2	4.3	47.7	41.7
Sao Paulo	Brazil	Latin America	34.8	28.1	0.2	1.1	38.2	32.5
Santiago	Chile	Latin America	33.9	24.0	2.5	5.1	34.1	31.1
Bogota	Colombia	Latin America	41.0	29.1	2.5	9.0	38.3	35.0
Mexico City	Mexico	Latin America	40.3	23.3	1.0	3.2	37.8	45.3
Chicago	USA	North America	11.1	10.3	0.5	1.3	6.3	6.9
Los Angeles	USA	North America	13.2	12.0	0.7	2.0	6.0	6.0
New York City	USA	North America	31.8	30.2	0.7	1.8	32.0	30.4

Among the three modes of transport, levels of cycling show greatest variation across the cities. The lowest levels of cycling are in Accra and Cape Town, with almost no cycling among females and less than a percent among males. The highest levels are in the four German cities with an average of 14-15% for the two gender groups. The gender differences are the highest for this mode of transport, and in a direction opposite to that of walking. On average, females are half as likely as males to cycle. The notable exceptions are the German cities of Berlin,

Munich, and Hamburg, where females are **more** likely to cycle than males. Cycling levels are generally the highest among the working age group followed by children, and the lowest among older adults. The gender differences vary greatly over the age groups. Among children, girls are 30% less likely to cycle than boys. Among working age groups and older adults, gender differences are equally high, with about 50% lower likelihood among women than men.

Highest levels of public transportation mode shares are in the Latin American cities of Bogota, Buenos Aires, Mexico City, Santiago, and Sao Paulo, with an average of 39% among females, and 37% among males. These levels are many times greater than in Chicago, Los Angeles, and Melbourne, which have the lowest levels of public transport use (average of 7% for the two gender groups). In all the cities, except Delhi and Mexico City, females are more likely to use public transport. On an average, likelihood to use public transport among females is about 6% higher than among males. The use of public transport is lowest among the children, highest among the working age, and slightly lower among the older adults than the working age. Gender difference in the use of public transportation is highest among older adults. In this age group, women are, on average, 26% more likely to use public transportation than men. Among children and working age group, females are only 5-6% more likely, on average.

Table 3: Mode shares for work trips by gender and for all age groups combined

City	Country	Region	Walking (%)		Cycling (%)		Public Transport (%)	
			Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	47.3	30.5	0.3	1.1	36.3	39.2
Kisumu	Kenya	Africa	37.1	27.6	1.9	7.0	27.0	23.6
Cape Town	South Africa	Africa	15.3	15.6	0.4	0.8	41.7	31.5
Delhi	India	Asia	37.6	25.7	2.2	10.0	34.4	28.8
Melbourne	Australia	Australia	8.5	7.0	1.6	2.6	19.1	15.0
London	England	Europe	16.6	11.8	2.6	6.2	49.1	42.9
Berlin	Germany	Europe	6.5	7.5	19.0	16.3	40.5	33.7
Cologne	Germany	Europe	10.0	10.0	17.5	18.3	25.3	26.2
Hamburg	Germany	Europe	7.1	6.2	16.9	14.6	35.6	32.3
Munich	Germany	Europe	6.0	6.7	18.0	19.4	40.7	32.0
Zurich	Switzerland	Europe	23.1	19.3	8.1	8.9	33.5	24.3
Buenos Aires	Argentina	Latin America	13.6	9.3	2.2	5.6	67.9	49.5
Sao Paulo	Brazil	Latin America	23.7	18.2	0.2	1.6	50.9	36.7
Santiago	Chile	Latin America	14.3	10.2	2.4	6.1	56.8	42.6
Bogota	Colombia	Latin America	15.0	10.3	3.0	11.7	61.3	42.8
Mexico City	Mexico	Latin America	15.4	11.3	1.0	3.7	59.0	53.5
Chicago	USA	North America	8.5	6.4	0.6	1.2	11.6	8.9
Los Angeles	USA	North America	6.8	5.2	0.5	2.5	8.1	7.2
New York City	USA	North America	10.9	9.5	0.7	2.0	57.0	54.2

3.3 Mode shares of work trips

In **Table 3**, we present modes shares of the walking, cycling and public transport for work trips. For this analysis, we present results only for all age groups combined, as work trips exclude children and most older adults. Among work trips, public transportation is the most common mode of transport, walking is the second most common, followed by cycling. Women have on average 25% higher likelihood to walk to work than men—similar to the finding for all trips (**Table 2**). Highest levels of walking are in Accra, Delhi, and Kisumu with an average of 41% among women and 28% among men. Lowest levels of walking to work are in Chicago, Hamburg, Los Angeles, and Munich, with an average of 6-7% among women and men.

The levels of public transportation among women are the highest in Bogota, Buenos Aires, Mexico City, New York City, and Santiago, ranging from 57 to 68%, while among men, these levels range from 37 to 54% in those cities. In contrast, in Chicago and Los Angeles, use of public transportation among women is 8-12%, and among men, less than 10%. Women are on average 21% more likely than men to use public transport to travel to work, and this gender gap is much higher than in all trips combined. The gender differences in the use of public transport are the highest in the Latin American cities.

Similar to the finding in the previous section, the four German cities have the highest levels of cycling to work, and these levels are even higher than their corresponding values in all trips combined, presented in **Table 2**. Bogota and Delhi are the other two cities with high levels (10-12%), though only among men. In general, likelihood of cycling to work is higher than the likelihood of cycling in general. On average, women are half as likely as men to cycle to work, which is the same level of gender gap as we found among all trips.

3.5 Active travel time

Figure 2 presents harmonised active travel time per capita. The cities indicating 'reported' used reported stage-level travel time and those indicating 'harmonised' used the estimated travel time for stages (see Method section). In all cities except Accra and Delhi, females spend more time travelling actively than males, though the gender differences in most cities are small. On average, females have 5% higher active travel time per capita than males, with values of 24.4 minutes and 23.3 minutes, respectively. Chicago has the lowest levels with 5.5 minutes among females (f) and 5.2 minutes among males (m), followed by Melbourne (10.5: f; 10.7: m) and Los Angeles (10.5: f, 10.6: m). The highest levels are in Accra (48: f; 50: m) and in Zurich (38: f; 36: m). The gender difference is the highest in Delhi and Buenos Aires, though in opposite directions. In the former, females have 33% **lower** levels of activity than males, and in the latter, females have 15% **higher** levels of activity than males.

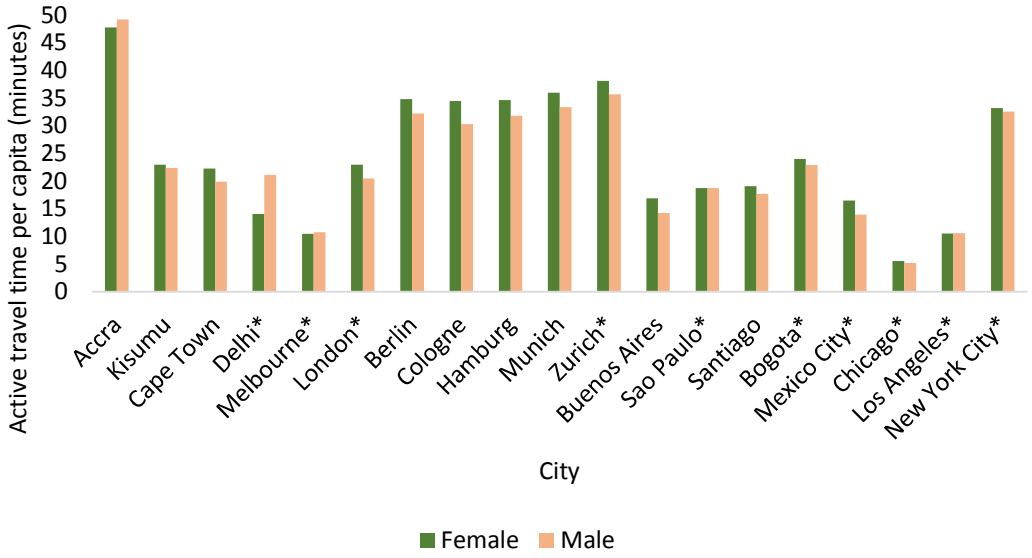

Figure 2: Active travel time per capita by gender for all age groups combined (asterisk represent those cities which use reported data, and others represent harmonised estimates)

Among the age groups, working age adults has the highest level of active travel time per capita, and females have a higher level than males (26.1 minutes and 24.3 minutes, respectively). Older women have the lowest levels among all gender and age sub-groups, and the gender difference within this age group is also the highest— women have on average 16% **lower** active travel time per capita than males. This gender difference among older adults is in an opposite direction to the other two age groups— among children and working age groups, females have **higher** levels of activity than males. In Delhi and Buenos Aires, which have the highest gender difference for all age groups combined, activity levels are equal among children. It is in the higher age groups that the gender gap widens for the two cities, except in Buenos Aires, two gender groups are again equal among older adults. Using the alternate method for harmonisation, we found that the average results of most cities are within 4 percent of the estimates obtained using the main approach (see SI). Thus, our results are not sensitive to the assumption used for harmonisation.

Table 4: Percentage share of total active travel time contributed by different main modes (harmonised to account for active travel while using PT; colour coding specific to gender for all modes combined)

City	Country	Region	Active travel for public transport	Females			Males		
				Walking	Cycling	Public transport	Walking	Cycling	Public transport
Accra	Ghana	Africa	harmonised	81.1	0.0	17.8	79.5	1.2	19.3
Kisumu	Kenya	Africa	harmonised	76.2	3.7	18.4	69.6	10.9	19.5
Cape Town	South Africa	Africa	harmonised	65.6	0.4	31.8	69.1	1.0	29.9
Delhi	India	Asia	reported	90.5	1.5	6.6	61.2	21.3	16.4
Melbourne	Australia	Australia	reported	60.4	6.9	31.2	53.4	14.3	30.4
London	England	Europe	reported	62.2	3.0	30.7	51.4	10.0	34.5
Berlin	Germany	Europe	harmonised	47.5	23.1	27.4	46.3	27.7	26.0
Cologne	Germany	Europe	harmonised	57.9	22.9	16.6	50.3	30.3	19.3
Hamburg	Germany	Europe	harmonised	52.8	22.3	22.6	47.6	27.8	24.6
Munich	Germany	Europe	harmonised	46.3	25.9	25.7	43.5	30.5	26.0
Zurich	Switzerland	Europe	reported	75.1	8.1	14.5	71.3	12.5	14.2
Buenos Aires	Argentina	Latin America	harmonised	44.0	2.7	51.3	36.9	8.3	54.7
Sao Paulo	Brazil	Latin America	reported	48.6	0.3	42.2	44.2	3.4	39.8
Santiago	Chile	Latin America	harmonised	47.4	3.9	46.1	39.8	13.9	46.3
Bogota	Colombia	Latin America	reported	67.2	6.5	23.4	49.1	28.0	19.2
Mexico City	Mexico	Latin America	reported	63.9	1.8	33.2	43.5	8.2	47.2
Chicago	USA	North America	reported	72.6	4.1	20.5	66.7	10.5	20.2
Los Angeles	USA	North America	reported	70.8	5.6	22.3	59.5	18.7	20.6
New York City	USA	North America	reported	51.0	1.7	42.9	48.9	3.6	41.9

In **Table 4**, we present share of total active travel time (walking and cycling) contributed by the three categories of main mode—walk, cycle, and public transport. Note that the percentages across the three modes do not sum to 100% as some part of active travel (2 to 3%) is contributed by other modes of transport, for example, cars and motorised two-wheelers. On average, females obtain 62% of their active travel time from those trips in which they walked all the way. In comparison, this share is 54% among males. The three cities with the highest contribution from walking among females are Delhi (91%), Accra (81%), and Kisumu (76%). Among males, highest contribution from walking is in Accra (80%), Kisumu (70%), and Zurich (71%).

Cycling contributes an average of 8% of total active travel time among females across the cities, while it contributes about twice as much (15%) among males. The four German cities have the highest contribution of cycling to active travel time, with an average of 24% among females and 29% among males. The average contribution of public transport to total active travel time is 28-29% for the two gender groups, and the gender gap is the lowest among the three modes of transport. The three cities with the highest contribution of public transport to active travel time for females are Buenos Aires, New York City and Santiago (43-51%), and for males are Buenos Aires, Mexico City and Santiago (46-55%). Delhi has the lowest contribution by public transport for females (8%) and Zurich for males (14%).

Among the three age groups, walking has the highest contribution to active travel time among children, and the lowest among working age group. Public transport and cycling have the highest contribution among the working age group. The lowest share of public transport is among children, and the lowest share of cycling is among older adults. The gender differences are the lowest among children for all the three modes. The highest gender gap for walking is among working age adults, and the highest gender gap for cycling is among working age and older adults. For these two age groups, the share of cycling to active travel time among females is half that of males.

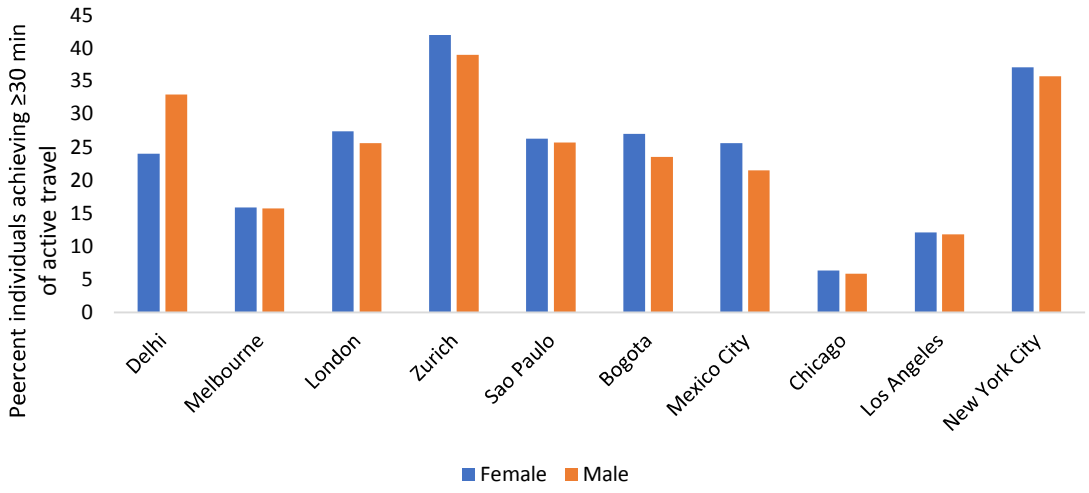

Figure 3: Percentage of individuals attaining at least 30 minute of active travel time

3.5 Individuals gaining 30 minutes or greater of active travel time

In **Figure 3**, we present the percentage of individuals across all age groups reporting at least 30 minutes of daily active travel time. We present this metric for the 10 cities for which stage-level duration of travel was available. Compared to the full set of 19 cities, these 10 cities include representation of all the regions except Africa. On an average, one in every four people achieve 30 minutes of daily active travel. The gender gap in achieving this level is the highest in Delhi where 24% females achieve 30 minutes of active travel compared to 33% males. Delhi is also the only city where this proportion is lower among females than among males. Excluding Delhi, on an average, females have 7% higher likelihood to achieve 30 minutes of active travel than males. Among these, the highest gender gap is in the Latin American cities of Bogota and Mexico City—27% females versus 24% males in the former, and 26% females and 22% males in the latter.

Among the three age groups, working age adults are most likely to achieve at least 30 minutes of active travel and older adults have the lowest, with children in the middle. Children are most gender equal among the three age

groups. In Delhi, where overall gender gap is the highest, there is no gender gap among the children. In Mexico City and Bogota also, the gender gap among children is much smaller than the other age groups. Working age group has similar gender gap (females more likely) as all age groups combined, and among older adults, the gender gap is in an opposite direction, and females are 8% less likely than males to achieve 30 minutes of active travel.

4 DISCUSSIONS

4.1 Summary of findings

In most cities, females have greater level of immobility than males. In some cities of low-and-middle income countries (Delhi, Accra, Sao Paulo), this gender gap is much wider. Females in all cities are more likely to walk for all trips combined and, in most cases, more likely to use public transport compared to males. This relationship reverses in cycling and females are always less likely users than males, except in German cities. For commuting to work, women's use of public transportation is significantly greater than men. Per capita active travel time is highest in Accra and New York City, followed by the German cities. About one-third of total active travel time across the cities is from active travel related to public transport. In some of the Latin American cities, this proportion is as high as 50 percent. On average, daily travel results in one in every four people in the population to achieve at least 30 minutes of active travel, though there is large variation across the cities. In general, females are more likely to achieve this level than males. The gender differences of active travel metrics are often age dependent. Children (<16 years) are often gender equal and gender disparity increases with age.

An interesting finding is that despite large gender differences in the use of modes of transport, as expressed by mode shares, overall levels of active travel time are remarkably similar. We also found regional differences in the sources of active travel. In Latin America, public transport is most dominant, in Germany, cycling, and in Africa and Asia, walking. German cities are clear outliers with their high levels of cycling as well as gender equality in its use. This is in line with a global comparison of cycling in the cities (Goel et al., 2021) that reported greater gender equality in cycling use in the cities with high levels of cycling. Cities in the US (except New York City) and Australia have exceptionally low use of all the three modes of transport. There is no indication that the use of any one mode explains the activity levels of population. For example, Latin American cities with greater contribution by public transport has similar levels of active travel time as Indian or African cities dominated by walking. Similarly, New York city dominated by public transport has similar levels of active travel time as German cities dominated by cycling.

4.2 Meaning of our findings

Our study results highlight the levels of physical activity that can be achieved from daily travel as well as the modes of transport that contribute to this activity. While the former is a determinant of health, the latter determines the access to the city. In Bogota, for example, females and males have almost the same levels of active travel time (24 and 23 minutes per capita). However, males gain a much greater proportion of active travel time by cycling than females (28% and 7%), and therefore the former can achieve far greater spatial access. Similarly, in Delhi, females gain almost no active travel from cycling, while men gain up to 20% of all active travel time. Thus a focus on active travel time alone underestimates gender differences in travel behaviour and its impact on access. Gender inequality often results in lower access to vehicles for women, which increases their dependence on active travel and public transport (Peters, 2011). Within active travel, lack of safe environments, cultural norms, and fear of harassment discourage women from cycling (Garrard et al., 2008b; Goel et al., 2021; Iqbal et al., 2020; Prati, 2018; Ravensbergen et al., 2020). Therefore, in populations with high levels of gender inequality, low vehicle ownership and poor or no infrastructure for cycling, women are particularly disadvantaged. Gender inequality in cycling use and poor infrastructure are interrelated. Cycling without appropriate provision can be seen as out of place and stigmatised (Aldred, 2013), therefore, women who already suffer disadvantage in society are likely to risk compounding their disadvantage by using a stigmatised mode.

In Delhi, for example, 66% of trips by females are by walking, compared to 40% by males, and almost all cycling trips are made by males (Goel et al., 2021). This lack of access to cycling and greater dependence on slower modes of transport, combined with women's disproportionate share of household responsibilities, compounds gender inequalities (Anand & Tiwari, 2006; Peters, 2011). A contrasting example is Berlin, which is a much more gender equal society *and* has safe infrastructure for cycling. As a result, the city has high levels of gender equality in both active travel time as well as the modes of transport used. Similar results were reported by (Goel et al., 2021) for many settings (countries and cities) in Western Europe with high levels of gender equality and safe infrastructure of cycling. These regional differences across the world have also been highlighted by a global study analysing GPS traces of individuals (Alessandretti et al., 2020). The study found that Western European countries have the highest gender equality in daily mobility, expressed in terms of spatial coverage of movement, while countries such as Saudi Arabia, India, South Korea, and Chile are among the least equal. Thus, the efforts to improve active travel among the population should ensure a city that is accessible by walking, cycling and public transport, and this requires reducing road traffic danger and risk of harassment and assault by men. Car use can provide some protection from danger (though increasing risks to others), and gender equity in car access should be a goal. However, in lower income cities, car ownership is far out of the reach of the majority of the population, whilst in

higher income cities car ownership and use should be reduced to tackle climate change and its other adverse effects. Reducing these sources of danger and challenging norms that stop women from cycling, can strive to achieve gender equity in activity levels and in access to the city.

By presenting active travel time as well as its contributors in terms of modes of transport, our study results also highlight a strong link between transport and public health. The results show that transportation system of a city is a strong determinant of the amount of active travel time gained by individuals, how they achieve this time, and how this translates to gender differences in access. The results add empirical evidence to the findings by (Salvo et al., 2021), in which authors highlighted the importance of transport infrastructure in the promotion of population-level physical activity in the cities, though their results were not gender stratified.

4.3 Unanswered questions and future research

We found results of Delhi at odds with other cities in our analysis. In Delhi, the level of immobility of women is much lower than men. Also, only in Delhi, females had much lower levels of active travel activity than males. In all other cities, it was the reverse, and the gender gap was much smaller. One explanatory factor could be that India has one of the lowest levels of paid work-participation rate among women in the world (Deshpande & Kabeer, 2019). According to the Census data of India, women constituted only 17 per cent of all workers in urban areas who reported travelling to work outside home (Census-India, 2016). An analysis of time-use survey in Pakistan, a neighbouring South Asian country, also reported that immobility level of women was 55% compared to only 4% of men (Adeel et al., 2013). The same study reported men make twice as many daily trips as women. Reasons for high level of female immobility in South Asia needs further investigation in future research.

Travel surveys ask for travel-related activities in a diary format for a specific day, and only less frequently, for two days or a full week. At the population level, such surveys represent travel activity for a typical day. This is markedly different from standardised physical activity surveys that ask individuals about their physical activity behaviour for the past or a typical week. One day travel diary surveys may therefore underestimate active travel that individuals may engage in less frequently, such as walking to the park. This is one reason why physical activity prevalence from travel diaries and physical activity questionnaire may not be comparable. Additionally, there are quality issues in the survey datasets that may have some impact on the estimates of travel physical activity. For example, while some surveys were conducted across the year, many were conducted only during certain period of the year. This may bias our results if there is seasonality in the use of active travel.

As a result of single-day reporting in travel surveys, level of immobility (Figure 1) has a significant effect on population-level outcomes such as average active travel time per capita (Figure 2). If an individual does not report any travel activity on the assigned day, he/she is excluded from any active travel. The absence of travel activity could be because on the survey day the person could not go out of home or did not need to. It could also result from underreporting by respondents, for example, due to proxy responses (Madre et al., 2007; Wang et al., 2021). A large proportion of individuals not reporting any trip would bring down the population-level activity levels, even if those who did report a trip were predominantly engaging in active travel. Future studies should investigate the impact that duration of travel diary (one day, two days, or a week) has on the estimates of active travel duration as well as resulting gender differences, and whether such methods of survey reduce underreporting. There is also a need to develop methods to harmonise estimates of travel diary with those reported by physical activity surveys.

5 CONCLUSIONS

We used population-representative travel surveys for 19 major cities across 13 countries and 6 continents, representing a mix of cities from low-and-middle income (n=8) and high-income countries (n=11). We found that in many cities there are large gender differences in the modes of transport that individuals use to attain travel physical activity even if the levels of activity are almost the same. We argue that these gender differences stem in part from social norms that restrict women to certain modes of transport combined with lack of safe infrastructure for active travel, most notably cycling. Evaluations of transport policies in general, and active travel policies in particular, should focus on the pathways that result in reduced risk of traffic danger, harassment, and assault while using active travel modes and normalise cycling amongst women.

ACKNOWLEDGEMENT

This project (JW, RG, LT) has received funding from the European Research Council (ERC) under the Horizon 2020 research and innovation programme (grant agreement No 817754). This material reflects only the author's views and the Commission is not liable for any use that may be made of the information contained therein. OO is affiliated to the National Institute for Health Research (NIHR) Applied Research Collaboration (ARC) West Midlands. The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care. This paper presented independent research and the views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health. LF was funded by the Global Diet and Activity Research Group. This group was funded by the National Institute for Health Research (NIHR) (16/137/64) using UK aid from the UK Government to support global health research. The views

expressed in this publication are those of the author(s) and not necessarily those of the NIHR or the UK Department of Health and Social Care.

CONFLICT OF INTEREST

On behalf of all authors, the corresponding author states that there is no conflict of interest.

AUTHORS' CONTRIBUTION

RG and OO conceptualised the study with inputs from all authors. RG curated and analysed the data. RG wrote the manuscript with inputs from all authors.

REFERENCES

Adeel, M., Yeh, A. G. O., & Zhang, F. (2013). *Gender, mobility and travel behavior in Pakistan: Analysis of 2007 Time Use Survey*. *39922*, 0–29.

Aldred, R. (2013). Incompetent or too competent? Negotiating everyday cycling identities in a motor dominated society. *Mobilities*, *8*(2), 252–271.

Aldred, R., Elliott, B., Woodcock, J., & Goodman, A. (2017). Cycling provision separated from motor traffic: a systematic review exploring whether stated preferences vary by gender and age. *Transport Reviews*, *37*(1), 29–55.

Alessandretti, L., Aslak, U., & Lehmann, S. (2020). The scales of human mobility. *Nature*, *587*(7834), 402–407. https://doi.org/10.1038/s41586-020-2909-1

Althoff, T., Sosič, R., Hicks, J. L., King, A. C., Delp, S. L., Leskovec, J., Gauvin, L., Tizzoni, M., Piaggesi, S., Young, A., Adler, N., Verhulst, S., Ferres, L., Cattuto, C., Kraemer, M. U. G., Sadilek, A., Zhang, Q., Marchal, N. A., Tuli, G., … Lehmann, S. (2020). Gender gaps in urban mobility. *Nature Human Behaviour*, *547*(7663), 336–339. https://doi.org/10.1038/s41562-020-0875-0

Anand, A., & Tiwari, G. (2006). A gendered perspective of the shelter–transport–livelihood link: the case of poor women in Delhi. *Transport Reviews*, *26*(1), 63–80.

Besser, L. M., & Dannenberg, A. L. (2005). Walking to public transit: steps to help meet physical activity recommendations. *American Journal of Preventive Medicine*, *29*(4), 273–280.

Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., Carty, C., Chaput, J.-P.,

Chastin, S., Chou, R., Dempsey, P. C., DiPietro, L., Ekelund, U., Firth, J., Friedenreich, C. M., Garcia, L., Gichu, M., Jago, R., Katzmarzyk, P. T., … Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British Journal of Sports Medicine*, *54*(24), 1451 LP – 1462. https://doi.org/10.1136/bjsports-2020-102955

Census-India. (2016). *B-28 "Other Workers" by distance from residence to place of work and mode of travel to place of work – 2011 (India/states/UTs/district)*. Census of India 2011.

Deshpande, A., & Kabeer, N. (2019). *(In) visibility, care and cultural barriers: the size and shape of women's work in India*.

Garrard, J., Rose, G., & Lo, S. K. (2008a). Promoting transportation cycling for women: the role of bicycle infrastructure. *Preventive Medicine*, *46*(1), 55–59.

Garrard, J., Rose, G., & Lo, S. K. (2008b). Promoting transportation cycling for women: The role of bicycle infrastructure. *Preventive Medicine*, *46*(1), 55–59. https://doi.org/10.1016/j.ypmed.2007.07.010

Gauvin, L., Tizzoni, M., Piaggesi, S., Young, A., Adler, N., Verhulst, S., Ferres, L., & Cattuto, C. (2020). Gender gaps in urban mobility. *Humanities and Social Sciences Communications*, *7*(1), 1–13. https://doi.org/10.1057/s41599-020-0500-x

Gekoski, A., Gray, J. M., Adler, J. R., & Horvath, M. A. H. (2017). The prevalence and nature of sexual harassment and assault against women and girls on public transport: An international review. *Journal of Criminological Research, Policy and Practice*.

Goel, R., Goodman, A., Aldred, R., Nakamura, R., Tatah, L., Garcia, L., Zapata-Diomedi, B., De Sa, T., Tiwari, G., de Nazelle, A., Tainio, M., Buehler, R., Gotschi, T., & Woodcock, J. (2021). Cycling behaviour in 17 countries across 6 continents: levels of cycling, who cycles, for what purpose, and how far? *Transport Reviews*. https://doi.org/10.1080/01441647.2021.1915898

Iqbal, S., Woodcock, A., & Osmond, J. (2020). The effects of gender transport poverty in Karachi. *Journal of Transport Geography*, *84*, 102677.

Kwan, M. (2000). Gender differences in space-time constraints. *Area*, *32*(2), 145–156.

Law, R. (2002). Gender and daily mobility in a New Zealand city, 1920–1960. *Social & Cultural Geography*, *3*(4), 425–445. https://doi.org/10.1080/1464936021000032441

Madre, J. L., Axhausen, K. W., & Brög, W. (2007). Immobility in travel diary surveys. *Transportation*, *34*(1), 107–128. https://doi.org/10.1007/s11116-006-9105-5

Morency, C., Trépanier, M., & Demers, M. (2011). Walking to transit: an unexpected source of physical activity. *Transport Policy*, *18*(6), 800–806.

Patterson, R., Webb, E., Millett, C., & Laverty, A. A. (2019). Physical activity accrued as part of public transport use in England. *Journal of Public Health (United Kingdom)*, *41*(2), 222–230. https://doi.org/10.1093/pubmed/fdy099

Pedersen, B. K., & Saltin, B. (2015). Exercise as medicine - Evidence for prescribing exercise as therapy in 26 different chronic diseases. *Scandinavian Journal of Medicine and Science in Sports*, *25*, 1–72. https://doi.org/10.1111/sms.12581

Peters, D. (2011). *Gender and Sustainable Urban Mobility. Thematic study prepared for Global Report on Human Settlements 2013*.

Phadke, S. (2013). Unfriendly bodies, hostile cities: Reflections on loitering and gendered public space. *Economic and Political Weekly*, *48*(39), 50–59.

Prati, G. (2018). Gender equality and women's participation in transport cycling. *Journal of Transport Geography*, *66*(May 2017), 369–375. https://doi.org/10.1016/j.jtrangeo.2017.11.003

Ravensbergen, L., Buliung, R., & Laliberté, N. (2019). Toward feminist geographies of cycling. *Geography Compass*, *13*(7), 1–24. https://doi.org/10.1111/gec3.12461

Ravensbergen, L., Buliung, R., & Laliberté, N. (2020). Fear of cycling: Social, spatial, and temporal dimensions. *Journal of Transport Geography*, *87*, 102813.

Rissel, C., Curac, N., Greenaway, M., & Bauman, A. (2012). Physical activity associated with public transport use-a review and modelling of potential benefits. *International Journal of Environmental Research and Public Health*, *9*(7), 2454–2478. https://doi.org/10.3390/ijerph9072454

Roth, M. A., Millett, C. J., & Mindell, J. S. (2012). The contribution of active travel (walking and cycling) in children to overall physical activity levels: A national cross sectional study. *Preventive Medicine*, *54*(2), 134–139. https://doi.org/10.1016/j.ypmed.2011.12.004

Sahlqvist, S., Song, Y., & Ogilvie, D. (2012). Is active travel associated with greater physical activity? The

contribution of commuting and non-commuting active travel to total physical activity in adults. *Preventive Medicine*, *55*(3), 206–211. https://doi.org/https://doi.org/10.1016/j.ypmed.2012.06.028

Salvo, D., Garcia, L., Reis, R. S., Stankov, I., Goel, R., Schipperijn, J., Hallal, P. C., Ding, D., & Pratt, M. (2021). *Physical Activity Promotion and the United Nations Sustainable Development Goals : Building Synergies to Maximize Impact*. 1–18.

Villanueva, K., Giles-Corti, B., & McCormack, G. (2008). Achieving 10,000 steps: A comparison of public transport users and drivers in a University setting. *Preventive Medicine*, *47*(3), 338–341. https://doi.org/10.1016/j.ypmed.2008.03.005

Wang, K., Hossain, S., & Nurul, K. (2021). *A hybrid data fusion methodology for household travel surveys to reduce proxy biases and under ‐ representation of specific sub ‐ group of population* (Issue 0123456789).

Warburton, D. E. R., & Bredin, S. S. D. (2017). Health benefits of physical activity: a systematic review of current systematic reviews. *Current Opinion in Cardiology*, *32*(5), 541–556.

Wener, R. E., & Evans, G. W. (2007). A morning stroll: levels of physical activity in car and mass transit commuting. *Environment and Behavior*, *39*(1), 62–74.

Table A1: Sources of travel surveys (cities in alphabetical order)

Country/City	Sampling and months of survey	Included in study	Survey Name and Access	Sample Unit	Response Rate	Survey method	Duration of Travel Diary	Survey Frequency	Years Analysed	City population	Sample Size (number of individuals)
Accra, Ghana	Stratified random sampling	Greater Accra Metropolitan area	Ghana Time use survey, Ghana Statistical Service	Household in Ghana	80%	face to face	1 random day	One time	2009	2,967,315	910
Berlin, Germany	Random digit dialling; Survey from May to September	City	The MiD (Mobilität in Deutschland) survey; https://daten.clearingstelle-verkehr.de/order-form.html.	Households in Germany	20% (2008)	CATI	1 nominated day	Quinquennial	2017	3,520,031	4099
Bogota, Colombia	Stratified random sampling; February to August	All	Mobility Survey - Prudecia Bogota; https://www.simur.gov.co/portal-simur/datos-del-sector/encuestas-de-movilidad/	Households in Bogota		Self	1 random day	Quinquennial	2015	7,400,000	52173
Buenos Aires, Argentina	Probabilistic, multi-stage and stratified sample	All	Household Mobility Survey 2009-2010: Mobility in the Buenos Aires Metropolitan Area; http://datar.info/pt_BR/dataset/enmodo-2014	Households in Greater Buenos Aires		Face to face	1 random day	One time	2009-2010	12,985,885	70321
Cape Town, South Africa	Stratified, systematic random sampling, March to June	City	National Household Travel Survey; www.statssa.gov.za	Households in Cape Town	89%	Face to face	1 random day	Quinquennial	2013	3,740,000	7144
Chicago, USA	Random Digit Dialling and Directory/Address-based sample; January to March	Chicago city: Cook and Dupage counties	Chicago Regional Household Travel Inventory; https://www.cmap.illinois.gov/data/transportation/travel-survey	Households within the 11-counties: Chicago and NW Indiana	30%	CATI	1 or 2 days	One time	2007 - 2008	2,696,000	32343

Country/City	Sampling and months of survey	Included in study	Survey Name and Access	Sample Unit	Response Rate	Survey method	Duration of Travel Diary	Survey Frequency	Years Analysed	City population	Sample Size (number of individuals)
Cologne, Germany	Same as for Berlin	City	Same as for Berlin							1,005,775	6224
Delhi, India	Two-stage stratified random sampling; March to September	City	accessed through Transportation Research and Injury Prevention Programme (TRIPP) at Indian Institute of Technology Delhi	Households in Delhi	65%	Face to face	1 random day	One time	2013	16,700,000	6684
Hamburg, Germany	Same as for Berlin	City	Same as for Berlin							1,787,408	17008
Kisumu, Kenya		City	Kisumu Household travel Survey; Institute for Transportation & Development Policy	Households in Kisumu		Face to face	1 random day	One time	2016	560,000	5767
London, England	Stratified random sampling using Postcode Address File; conducted throughout the year	All	London Travel Demand Survey; ltdsenquiries@tfl.gov.uk https://www.kisumu.go.ke/wp-content/uploads/2020/12/Kisumu-Sustainable-Mobility-Plan-200716.pdf	Households in London	50%	Face to face	1 nominated day	Continuous rolling survey	2011-2013	8,200,000	57677
Los Angeles, USA	Random sampling from addresses; throughout the year	Los Angeles County	2010–2012 California Household Travel Survey; https://www.nrel.gov/transportation/secure-transportation-data/tsdc-california-travel-survey.html	Households in California State	4.9%	CATI, online, or self	1 nominated day	one time	2012	3,792,621	21115

Country/City	Sampling and months of survey	Included in study	Survey Name and Access	Sample Unit	Response Rate	Survey method	Duration of Travel Diary	Survey Frequency	Years Analysed	City population	Sample Size (number of individuals)
Melbourne, Australia	Stratified cluster design; July to July	Metropolitan Melbourne	The Victorian Integrated Survey of Travel & Activity (VISTA); https://transport.vic.gov.au/about/data-and-research/vista	Households in 5 Metropolitan Melbourne regions and the Regional City region	46.3%	Self	1 nominated day	2015-16 is final phase of VISTA project that started in 2012	2012-13 to 2017-18	2,300,000	61321
Mexico City, Mexico	Stratified cluster design; January to March	Metropolitan area of the Valley of Mexico	Encuesta Origen-Destino en Hogares de la Zona Metropolitana del Valle de México 2017; https://www.inegi.org.mx/programas/eod/2017/	Households in the Mexico City Metropolitan Area	83%	Face to face	1 random day	One time	2017	19,383,068	200117
Munich, Germany	Same as for Berlin	City	Same as for Berlin							1,450,381	17180
New York city, USA	Random address sampling; September to November	New York City	2010/2011 Regional Household Travel Survey; Selected New York City residents for the analysis; http://www.njtpa.org/Data-Maps/Modeling-Surveys/Household-Travel-Survey/Data-Disclaimer.aspx?ext=.	Households in 28 counties in New York / New Jersey / Connecticut metropolitan area		Self	1 - nominated day	One time	2010 -2011	8,175,000	11707
Santiago, Chile	Probability Proportional to Size; July 2012 to Nov 2013	All	Encuesta Origen Destino de Viages 2012; http://www.sectra.gob.cl/encuestas_movilidad/encuestas_movilidad.htm#Results%20in%20reports%20and%20microdata%20available.High-income%20country	Households in Gran Santiago		Self	1 nominated day	Decade	2012	665,1735	60054

Country/City	Sampling and months of survey	Included in study	Survey Name and Access	Sample Unit	Response Rate	Survey method	Duration of Travel Diary	Survey Frequency	Years Analysed	City population	Sample Size (number of individuals)
Sao Paulo, Brazil	Stratified random sampling	City	São Paulo Metropolitan Region Mobility Survey; https://www.mobilize.org.br/estudos/137/pesquisa-de-mobilidade-da-regiao-metropolitana-de-sao-paulo-2012.html	Households in Sao Paulo Metropolitan area		Face to face	1 random day	Decade	2012 - 2013	20,012,000	24534
Zurich, Switzerland	Random selection using telephone; throughout the year	Zurich agglomeration (2012)	Microcensus Mobility and Transport 2015; Office fédéral de la statistique OFS, Section Mobilité	Households in Switzerland	53%	CATI	1 nominated day	Quinquennial	2015	1,660,000	5453

Table A2: Active travel time (walking+cycling) per trip in minutes

	Walking		Cycling		Bus		Metro		Train		Taxi		Car		Motorcycle	
City	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Accra	23.8	19.3		20.4												
Kisumu	21.8	25	25.2	21.6												
Cape Town	26.9	26.2	33.7	25												
Delhi	20.6	21.9	20.7	44	12.7	15.3	21.4	20.4			3.4	4.4				
Melbourne	13.4	13.2	22.2	24.9	12.7	12.5			15.2	15.7			0.1	0.1		
London	17.3	15.5	21.9	22	8.5	8.7	12.3	12.4	14.7	14.7	1.5	1.1	1	0.9	1.1	0.5
Berlin	21.3	20.6	18.4	22.6												
Cologne	26.5	21.6	19	19.8												
Hamburg	23.2	21.1	19	21.3												
Munich	24.1	21.4	18.7	20.5												
Zurich	23.1	22.5	16.1	18.4	7.9	8			11.6	12.1			0.6	0.4		
Buenos Aires	15.2	15.4	14.2	18.1												
Sao Paulo	14.9	14.9	22.2	30.6	10.8	10.3	13.7	13.9	16	15.3	3.1	3.1	3.5	3.2	2.9	2.8
Santiago	13.3	14.5	15.2	23.8												
Bogota	23.8	23.5	37.1	43.1	8.8	7.6					3.2	2.4	1.8	1.8	1.8	1.7
Mexico City	15.4	16.2	16.8	22.5	11.8	12.1	13.3	13.6	13.9	14.7	1.3	1.3	0.2	0.2	0.8	0.3
Chicago	14.6	14.9	19.6	19.1	9.7	9.7			10.7	11.3						
Los Angeles	19.7	19.3	27.8	37	15.6	15.5	17.4	18.1	17	18.4			0.1			0.4
New York City	18.7	18.6	26.9	23.1	14.7	16.7	17.5	17.2	15.2	21.5	3.2	3.8	1.3	1.6		

Table A3: Level of immobility (percentage individuals reporting making no trip on travel day) by gender and age

City	Country	Region	All age groups combined		Children		Working age group		Older adults	
			Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	20.4	8.5	14.4	13.5	19.1	4.9	50.0	22.9
Kisumu	Kenya	Africa	46.4	46.5	66.8	68.7	39.2	38.0	47.8	46.7
Cape Town	South Africa	Africa	26.4	25.9	5.0	6.3	24.3	24.5	55.9	56.1
Delhi	India	Asia	57.5	31.2	50.7	49.3	59.5	20.0	77.5	52.5
Melbourne	Australia	Australia	23.4	21.2	21.8	22.5	20.5	19.1	35.4	27.2
London	England	Europe	26.4	24.6	43.4	44.1	18.4	16.6	32.6	24.7
Berlin	Germany	Europe	19.4	16.7	12.4	13.4	18.4	15.1	25.2	23.5
Cologne	Germany	Europe	19.4	16.7	14.2	19.3	17.3	14.3	27.0	21.4
Hamburg	Germany	Europe	18.2	17.3	16.3	14.8	15.3	16.5	25.7	21.3
Munich	Germany	Europe	17.0	14.4	12.8	13.2	14.6	12.8	24.6	20.0
Zurich	Switzerland	Europe	11.0	8.4	10.0	7.3	7.6	7.5	20.0	11.6
Buenos Aires	Argentina	Latin America	37.9	33.5	39.4	40.8	31.1	25.9	58.1	48.7
Sao Paulo	Brazil	Latin America	32.0	23.1	21.0	22.9	28.6	18.3	62.1	48.6
Santiago	Chile	Latin America	23.2	19.5	27.2	27.9	18.9	15.2	33.3	24.3
Bogota	Colombia	Latin America	34.9	33.1	42.2	42.4	29.9	28.1	44.1	37.7
Mexico City	Mexico	Latin America	26.7	23.6	36.7	36.4	19.4	15.9	44.1	35.8
Chicago	USA	North America	12.7	11.1	12.7	12.4	9.5	8.3	22.4	19.1
Los Angeles	USA	North America	25.2	25.4	20.4	23.5	22.0	23.6	44.6	37.7
New York City	USA	North America	17.6	15.4	16.7	13.1	13.5	13.8	39.5	30.3

Table A4: Sample size (number of person by gender and age group)

City	Country	Region	All age groups combined		Children		Working age group		Older adults	
			Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	485	425	90	104	361	286	34	35
Kisumu	Kenya	Africa	3155	2612	783	705	2255	1825	46	45
Cape Town	South Africa	Africa	3714	3430	517	521	2477	2274	556	451
Delhi	India	Asia	2962	3722	816	1086	2005	2452	130	168
Melbourne	Australia	Australia	25143	36178	5173	8114	14838	21057	5132	7007
London	England	Europe	30213	27464	7141	7167	17429	15582	5643	4715
Berlin	Germany	Europe	2081	2018	249	278	1130	1031	695	705
Cologne	Germany	Europe	3139	3085	404	433	1750	1613	975	1030
Hamburg	Germany	Europe	8697	8311	1047	1061	4552	4162	3083	3070
Munich	Germany	Europe	8741	8439	1069	1202	4819	4493	2841	2736
Zurich	Switzerland	Europe	2741	2712	366	400	1608	1619	767	693
Buenos Aires	Argentina	Latin America	35889	34432	9350	10157	20080	19135	6449	5121
Sao Paulo	Brazil	Latin America	12898	11636	2706	2916	8088	7251	2104	1469
Santiago	Chile	Latin America	31679	28375	6562	6921	19166	17086	5951	4368
Bogota	Colombia	Latin America	27633	24540	5385	5721	17115	14925	5133	3894
Mexico City	Mexico	Latin America	103296	96821	24208	25846	65505	59944	13583	11031
Chicago	USA	North America	17125	15218	3027	3292	9118	8150	4980	3776
Los Angeles	USA	North America	10790	10325	1714	1851	7163	6889	1440	1286
New York City	USA	North America	6410	5297	997	1071	4447	3521	853	636

Table A5: Mode share of all age groups combined

City	Country	Region	All age groups combined									
			Walking (%)		Cycling (%)		Public Transport (%)		Car (%)		Motorcycles (%)	
			Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	60.6	56.4	0.1	0.8	28	23.6	6	10.5	-	-
Kisumu	Kenya	Africa	50.5	38.3	2.1	7	23.5	24.1	3.4	6.6	15	18.5
Cape Town	South Africa	Africa	30.2	29.2	0.1	0.4	32.8	27.3	33.3	39.3	0.1	0.6
Delhi	India	Asia	66.2	39.9	1.1	6.9	17.3	24	3.9	9.6	2.9	14.8
Melbourne	Australia	Australia	17	16.3	1.2	2.3	8.8	8.8	72.3	71.5	0	0.4
London	England	Europe	33.7	29.3	1.3	4	27.4	27.2	36.3	37.5	0.1	0.7
Berlin	Germany	Europe	26.8	24.1	15	13.2	23.7	19.7	28.4	33.6	0.4	0.5
Cologne	Germany	Europe	26	22.9	14.4	15	14.4	13.7	35.9	38.2	0.8	1.1
Hamburg	Germany	Europe	26.9	23.1	13.9	13.4	18.8	17.7	32.4	35.9	0.4	1.2
Munich	Germany	Europe	23.4	21.6	16.8	15.8	21.9	19.1	29.3	34	0.6	1.6
Zurich	Switzerland	Europe	37.1	32.1	5.7	6.9	17.7	14.5	37.6	42.5	0.4	1.4
Buenos Aires	Argentina	Latin America	32.1	22.3	2.2	4.3	47.7	41.7	14.1	27	0.3	2.3
Sao Paulo	Brazil	Latin America	34.8	28.1	0.2	1.1	38.2	32.5	25.8	33.6	0.6	4.2
Santiago	Chile	Latin America	33.9	24	2.5	5.1	34.1	31.1	23.9	33	-	-
Bogota	Colombia	Latin America	41	29.1	2.5	9	38.3	35	10.4	14.5	2.3	7.8
Mexico City	Mexico	Latin America	40.3	23.3	1	3.2	37.8	45.3	14.8	23.1	1.1	2.2
Chicago	USA	North America	11.1	10.3	0.5	1.3	6.3	6.9	80.9	80.3	-	-
Los Angeles	USA	North America	13.2	12	0.7	2	6	6	79.4	79	0.1	0.3
New York City	USA	North America	31.8	30.2	0.7	1.8	32	30.4	32.4	35.4	-	-

Table A6: Number of trips of all age groups combined

			All age groups combined									
			Walking		Cycling		Public Transport		Car		Motorcycles	
City	Country	Region	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	789	862	1	12	364	360	78	160	32	46
Kisumu	Kenya	Africa	2536	1625	105	295	1180	1021	172	282	24	114
Cape Town	South Africa	Africa	2025	1797	10	27	2199	1680	2237	2421	86	148
Delhi	India	Asia	1650	1869	23	267	489	1092	174	742	753	783
Melbourne	Australia	Australia	11052	14949	693	2049	4680	6866	51434	72141	208	476
London	England	Europe	23732	17802	974	2330	17971	15552	29584	26720	28	322
Berlin	Germany	Europe	1568	1359	814	755	1157	913	2113	2424	875	2693
Cologne	Germany	Europe	2329	2079	1253	1250	1255	996	3849	4272	122	321
Hamburg	Germany	Europe	6500	5479	3699	3516	4142	3576	9987	11056	58	444
Munich	Germany	Europe	6062	5646	4565	4364	5417	4543	8659	9744	40	138
Zurich	Switzerland	Europe	3341	3074	482	624	1461	1263	3655	4066	-	-
Buenos Aires	Argentina	Latin America	16549	11086	1468	2490	24920	21217	7038	13614	5	40
Sao Paulo	Brazil	Latin America	7942	6562	30	222	8558	7334	6622	8306	-	-
Santiago	Chile	Latin America	21116	12711	982	2888	22889	19737	11473	14964	-	-
Bogota	Colombia	Latin America	17533	11485	984	3040	16495	13276	5491	6635	239	1290
Mexico City	Mexico	Latin America	71203	36779	1891	5068	66088	70714	24512	34941	128	870
Chicago	USA	North America	3788	3174	203	430	2042	1999	37946	31207	132	1411
Los Angeles	USA	North America	3599	3132	245	590	1405	1313	27059	24548	3248	5523
New York City	USA	North America	6334	4840	169	327	6019	4847	6170	5554	-	-

Table A7: Mode share of children

			Children									
City	Country	Region	Walking (%)		Cycling (%)		Public Transport (%)		Car (%)		Motorcycles (%)	
			Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	86.1	84.4	-	0.7	10.8	11.3	2.4	2.7	-	-
Kisumu	Kenya	Africa	72.9	74.5	1.6	4.3	10	10.3	2.1	1	10.3	6.5
Cape Town	South Africa	Africa	53.6	53.3	0	0	20.9	21.9	-	0.3	24.1	23.2
Delhi	India	Asia	72.4	71.6	1.9	2.3	12.1	14.1	1.5	2.1	1	3
Melbourne	Australia	Australia	17.6	17.4	1.5	2.2	8.1	8.4	72.5	71.6	-	0
London	England	Europe	36.9	36.5	1.1	3.3	27.2	24.7	34.2	34.6	-	0.1
Berlin	Germany	Europe	28.3	28.3	22.6	22.5	16.8	14.2	24.3	26.1	0.5	0.5
Cologne	Germany	Europe	29.7	25.6	18	15.7	12.1	12	32	35	0.2	0.5
Hamburg	Germany	Europe	33.6	28.6	19.4	23	12.2	11.4	28.7	27	0.6	0.6
Munich	Germany	Europe	29.1	30.7	21.1	20.9	15.4	13	26.4	28.5	0.2	0.1
Zurich	Switzerland	Europe	51.8	51.4	7	10.8	15.9	13.3	21.9	15.7	0.8	1.1
Buenos Aires	Argentina	Latin America	48.3	49.2	1.8	2.4	32.6	32.5	14.5	13.1	0.3	0.3
Sao Paulo	Brazil	Latin America	52.6	54.9	0.2	0.5	31.4	30.4	15.4	13.9	0.2	0.2
Santiago	Chile	Latin America	40	42.9	3.6	2.4	20.5	19.7	20.7	20.2	-	-
Bogota	Colombia	Latin America	57.7	54.8	3	7	29.4	28.3	5.1	5.6	1.5	1.6
Mexico City	Mexico	Latin America	53.5	54.5	1.1	1.8	28.5	28.2	11.6	10.9	1.5	1.5
Chicago	USA	North America	14.7	13.8	0.8	1.8	10.1	11	74	72.8	-	-
Los Angeles	USA	North America	17.7	20.6	1.1	1.5	6.8	6.7	73.7	70.5	-	0
New York City	USA	North America	35	38.9	0.7	1.5	33.6	29.1	30	29	-	-

Table A8: Number of trips of children

			Children									
			Walking		Cycling		Public Transport		Car		Motorcycles	
City	Country	Region	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	34	0	0	2	3	-	2	179	219	524
Kisumu	Kenya	Africa	433	11	25	68	60	14	6	-	4	1951
Cape Town	South Africa	Africa	556	5664	6187	221	228	-	3	4	4	1335
Delhi	India	Asia	732	13	25	124	198	24	40	70	38	1066
Melbourne	Australia	Australia	3059	176	474	803	1295	8967	13774	8	4	7153
London	England	Europe	4054	154	360	2679	2459	4258	4267	-	2	15838
Berlin	Germany	Europe	111	247	254	46	52	148	159	405	463	771
Cologne	Germany	Europe	290	198	209	164	147	332	364	10	21	1314
Hamburg	Germany	Europe	741	620	697	334	318	873	816	-	14	3486
Munich	Germany	Europe	930	642	733	492	455	834	983	15	21	3307
Zurich	Switzerland	Europe	741	99	171	214	191	299	257	-	-	1828
Buenos Aires	Argentina	Latin America	4232	3670	3810	269	293	285	405	254	242	9099
Sao Paulo	Brazil	Latin America	2740	7	28	1523	1528	855	833	-	-	4879
Santiago	Chile	Latin America	4799	152	276	2269	2478	1762	1753	-	-	12205
Bogota	Colombia	Latin America	2078	182	182	242	210	157	407	1622	1571	10572
Mexico City	Mexico	Latin America	17362	18745	390	664	9092	9655	3475	3530	10	11
Chicago	USA	North America	686	37	107	630	710	4731	4779	17	54	2299
Los Angeles	USA	North America	820	60	70	234	252	3628	3667	631	714	2411
New York City	USA	North America	967	15	46	785	770	666	841	-	-	4685

Table A9: Mode share of working age group

City	Country	Region	Working age									
			Walking (%)		Cycling (%)		Public Transport (%)		Car (%)		Motorcycles (%)	
			Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	54	49.5	0.1	0.9	32.2	26	6.9	12.3	-	-
Kisumu	Kenya	Africa	46.7	32.3	2.2	7.2	25.5	26.4	3.7	7.3	16	20.8
Cape Town	South Africa	Africa	27	25.2	0.2	0.4	36.5	29.9	32.9	40.7	0.1	0.8
Delhi	India	Asia	63.2	29.1	0.5	8.6	20	27.5	5.1	12	3.8	19
Melbourne	Australia	Australia	16.6	15.6	1.2	2.6	9.6	10	71.9	70.5	0	0.5
London	England	Europe	33.4	27.4	1.4	4.6	27.6	28.5	36	37	0.1	0.9
Berlin	Germany	Europe	21.1	21.2	15.9	11.7	26.7	21.4	29.5	35.1	0.5	0.5
Cologne	Germany	Europe	23.3	20.7	15.8	16.8	15.2	15.4	36.1	37.4	1.1	1.1
Hamburg	Germany	Europe	23.8	21.4	13.9	12.4	21	20.7	32.6	35.7	0.3	1
Munich	Germany	Europe	20.9	19	16.9	15.5	23	20.9	29.5	34	0.6	1.8
Zurich	Switzerland	Europe	32.4	26.9	6.3	7.1	19.6	16.3	39.9	46.1	0.4	1.7
Buenos Aires	Argentina	Latin America	26.7	12.3	2.4	4.8	52.9	46	14.4	31.6	0.4	3.4
Sao Paulo	Brazil	Latin America	30.1	19.6	0.2	1.3	40.5	34	28.2	38.6	0.8	5.9
Santiago	Chile	Latin America	30	17.8	2.6	6	38.5	34.8	25.7	36.1	-	-
Bogota	Colombia	Latin America	35.2	20.3	2.9	10.7	42.5	37.2	11	16	2.9	10.9
Mexico City	Mexico	Latin America	36.5	13	1.1	3.5	41.3	52	15.5	26.2	1.1	2.6
Chicago	USA	North America	10.7	9.5	0.4	1.2	5.7	6.1	81.9	81.7	-	-
Los Angeles	USA	North America	12.5	9.7	0.7	2.2	6	6	80.4	81	0.1	0.4
New York City	USA	North America	31.1	27.6	0.8	1.9	32.3	31.7	32.5	36.2	-	-

Table A10: Number of trips of working age group

			Working age									
			Walking		Cycling		Public Transport		Car		Motorcycles	
City	Country	Region	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	561	1	10	313	295	67	140	21	25	20
Kisumu	Kenya	Africa	1151	91	255	1065	940	156	259	21	94	35
Cape Town	South Africa	Africa	1123	10	18	1804	1334	1624	1812	71	86	119
Delhi	India	Asia	1033	8	238	346	863	140	674	667	740	17
Melbourne	Australia	Australia	8843	447	1364	3308	4842	33627	44833	135	321	2030
London	England	Europe	10408	747	1794	12383	10666	20178	17134	28	270	3695
Berlin	Germany	Europe	668	519	404	749	567	1292	1413	769	2523	301
Cologne	Germany	Europe	992	849	772	835	647	2411	2411	54	166	252
Hamburg	Germany	Europe	2746	2257	1959	2766	2417	5940	6015	58	380	1028
Munich	Germany	Europe	2880	2887	2519	3450	2883	5311	5587	23	101	1944
Zurich	Switzerland	Europe	1555	324	379	1001	903	2496	2824	-	-	878
Buenos Aires	Argentina	Latin America	3721	1112	1710	18084	14869	4747	10261	5	37	2780
Sao Paulo	Brazil	Latin America	3359	23	186	6315	5320	5008	6382	-	-	509
Santiago	Chile	Latin America	5581	791	2200	17238	14471	8159	10866	-	-	4252
Bogota	Colombia	Latin America	5561	810	2387	12461	9359	4071	4819	182	1206	1925
Mexico City	Mexico	Latin America	46417	14057	1458	3767	51955	55370	18478	27165	118	843
Chicago	USA	North America	1887	131	264	1085	1066	22438	17413	107	1323	327
Los Angeles	USA	North America	1916	162	451	995	935	19598	17500	2352	4603	299
New York City	USA	North America	3318	146	256	4632	3659	4726	3818	-	-	621

Table A11: Mode share of older adults

City	Country	Region	Older adults									
			Walking (%)		Cycling (%)		Public Transport (%)		Car (%)		Motorcycles (%)	
			Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	40.9	50.5	0	0	45.5	33.3	9.1	12.9	-	-
Kisumu	Kenya	Africa	41.7	38.9	0	0	38.1	23.6	1.2	12.5	2.4	20.8
Cape Town	South Africa	Africa	17.8	13.1	-	1	24.9	15.8	46.2	59.9	-	0.7
Delhi	India	Asia	53.7	56.2	-	0.6	25	16.1	8.1	9.3	8.2	8.6
Melbourne	Australia	Australia	18.2	17.7	0.8	1.3	6	4.6	74	75.4	-	0.3
London	England	Europe	31.5	30.1	0.6	1.8	26.6	23.2	39.6	43.4	-	0.5
Berlin	Germany	Europe	40.1	31.1	8.1	11.2	20.2	18.2	28.3	34.2	0.1	0.5
Cologne	Germany	Europe	32.5	28.7	7.1	8.8	13.4	8.9	38.1	43	0.5	1.5
Hamburg	Germany	Europe	31.9	25.1	10.7	9.6	16.3	12.1	34.1	43.4	0.6	2.3
Munich	Germany	Europe	27.6	23.3	14.1	13.1	22.2	17.3	30.6	38.3	0.7	1.9
Zurich	Switzerland	Europe	44.3	38.2	3	3.6	12.4	9	39.2	47.3	0.1	0.6
Buenos Aires	Argentina	Latin America	31.3	20.8	1.1	5.9	47.1	37	11.3	31.6	0	0.3
Sao Paulo	Brazil	Latin America	25.5	24.2	-	0.4	38.2	25.8	34.2	48.1	-	0.9
Santiago	Chile	Latin America	43.8	27.4	0.3	4.1	32.6	29.2	20.2	36.8	-	-
Bogota	Colombia	Latin America	49.9	35.1	0.2	4.2	28.3	33.9	13	19.7	0.2	1.4
Mexico City	Mexico	Latin America	43.9	25.5	0.2	4	29.7	36.5	16	28.2	0.9	0.8
Chicago	USA	North America	8.8	7.8	0.3	0.7	4.1	3.6	85.5	86.7	-	-
Los Angeles	USA	North America	11.1	11.1	0.2	1.5	4.8	5.3	82	80.9	0.1	0.5
New York City	USA	North America	30	28.3	0.3	1.4	26.7	23.5	36.3	44.1	-	-

Table A12: Number of trips of older adults

			Older adults									
			Walking		Cycling		Public Transport		Car		Motorcycles	
City	Country	Region	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	31	0	0	2	3	0	0	638	791	
Kisumu	Kenya	Africa	28	2173	1978	32	17	1	9	3	14	20.8
Cape Town	South Africa	Africa	65	1784	1167	53	39	-	4	1100	1479	0.7
Delhi	India	Asia	27	676	796	3	11	-	2	2	15	8.6
Melbourne	Australia	Australia	3047	70	211	569	729	8840	13534	65	151	0.3
London	England	Europe	3340	73	176	2909	2427	5148	5319	-	50	0.5
Berlin	Germany	Europe	235	18	47	83	116	143	192	1015	1353	0.5
Cologne	Germany	Europe	200	808	601	184	225	204	267	3160	4210	1.5
Hamburg	Germany	Europe	832	42	102	536	616	822	855	-	50	2.3
Munich	Germany	Europe	1832	1035	1110	1464	1203	2504	3168	2	16	1.9
Zurich	Switzerland	Europe	778	59	74	246	169	860	985	-	-	0.6
Buenos Aires	Argentina	Latin America	2107	3291	2114	500	241	71	375	221	246	0.3
Sao Paulo	Brazil	Latin America	463	-	8	720	486	759	1091	-	-	0.9
Santiago	Chile	Latin America	2331	39	412	3382	2788	1552	2345	-	-	
Bogota	Colombia	Latin America	1839	608	509	658	356	17	246	666	1770	1.4
Mexico City	Mexico	Latin America	7424	3977	43	637	5041	5689	2559	4246	-	16
Chicago	USA	North America	223	85	54	95	62	35	59	10	28	
Los Angeles	USA	North America	317	8	49	110	104	2687	2707	265	206	0.5
New York City	USA	North America	487	8	24	486	352	681	818	-	-	

Table A13: Mode share of work trips of all age groups

City	Country	Region	Walking (%)		Cycling (%)		Public Transport (%)		Car (%)		Motorcycles (%)	
			Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	47.3	30.5	0.3	1.1	36.3	39.2	5.1	13.0	0.0	0.0
Kisumu	Kenya	Africa	37.1	27.6	1.9	7.0	27.0	23.6	8.8	9.4	20.4	25.0
Cape Town	South Africa	Africa	15.3	15.6	0.4	0.8	41.7	31.5	41.1	49.9	0.1	1.2
Delhi	India	Asia	37.6	25.7	2.2	10.0	34.4	28.8	10.4	12.6	8.9	19.7
Melbourne	Australia	Australia	8.5	7.0	1.6	2.6	19.1	15.0	70.2	74.0	0.1	0.8
London	England	Europe	16.6	11.8	2.6	6.2	49.1	42.9	30.3	36.5	0.4	1.7
Berlin	Germany	Europe	6.5	7.5	19.0	16.3	40.5	33.7	26.1	30.2	0.3	1.1
Cologne	Germany	Europe	10.0	10.0	17.5	18.3	25.3	26.2	36.2	35.1	1.4	1.5
Hamburg	Germany	Europe	7.1	6.2	16.9	14.6	35.6	32.3	29.7	33.4	0.4	1.3
Munich	Germany	Europe	6.0	6.7	18.0	19.4	40.7	32.0	25.7	30.6	0.6	2.0
Zurich	Switzerland	Europe	23.1	19.3	8.1	8.9	33.5	24.3	34.2	44.7	0.6	2.2
Buenos Aires	Argentina	Latin America	13.6	9.3	2.2	5.6	67.9	49.5	13.5	30.4	0.3	3.5
Sao Paulo	Brazil	Latin America	23.7	18.2	0.2	1.6	50.9	36.7	23.9	36.6	1.0	6.2
Santiago	Chile	Latin America	14.3	10.2	2.4	6.1	56.8	42.6	22.1	35.3	0.0	0.0
Bogota	Colombia	Latin America	15.0	10.3	3.0	11.7	61.3	42.8	11.1	15.7	4.0	13.9
Mexico City	Mexico	Latin America	15.4	11.3	1.0	3.7	59.0	53.5	19.6	26.6	0.8	2.4
Chicago	USA	North America	8.5	6.4	0.6	1.2	11.6	8.9	76.7	81.4	0.0	0.0
Los Angeles	USA	North America	6.8	5.2	0.5	2.5	8.1	7.2	84.1	84.2	0.1	0.6
New York City	USA	North America	10.9	9.5	0.7	2.0	57.0	54.2	28.5	32.1	0.0	0.0

Table A14: Number of work trips of all age groups

			Walk		Bike		Public transport		Car		Motorcycles	
City	Country	Region	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	167	134	1	5	128	172	18	57	0	0
Kisumu	Kenya	Africa	249	289	13	73	181	248	59	99	68	1169
Cape Town	South Africa	Africa	310	325	9	16	843	656	831	1040	2	15
Delhi	India	Asia	170	758	7	233	170	755	68	602	3	24
Melbourne	Australia	Australia	880	1407	140	556	1964	3261	8596	17626	44	262
London	England	Europe	1927	1708	328	908	5559	6219	4184	6626	17	53
Berlin	Germany	Europe	53	57	146	127	322	223	283	270	0	0
Cologne	Germany	Europe	110	97	200	214	280	273	536	702	50	846
Hamburg	Germany	Europe	245	214	573	592	1115	1024	1222	1462	25	27
Munich	Germany	Europe	243	262	697	786	1364	1202	1028	1367	7	167
Zurich	Switzerland	Europe	356	403	124	159	503	501	590	1058	12	52
Buenos Aires	Argentina	Latin America	1767	1908	380	1350	8876	10806	1778	6694	0	0
Sao Paulo	Brazil	Latin America	2237	2342	14	164	4478	4222	2503	4637	83	671
Santiago	Chile	Latin America	1696	1954	316	1591	8136	10438	2241	6089	39	113
Bogota	Colombia	Latin America	1617	1526	292	1295	5904	5310	1360	2340	0	0
Mexico City	Mexico	Latin America	8222	9927	515	3281	30755	45873	9806	22151	2	43
Chicago	USA	North America	518	577	43	95	597	654	6016	7581	367	1594
Los Angeles	USA	North America	267	283	32	121	308	337	4020	5142	137	262
New York City	USA	North America	344	298	31	87	1940	1789	968	1056	442	2066

Table A15: Percentage contribution to total active travel time by different main modes for all age groups

City	Country	Region	Active travel for public transport	Females			Males		
				Walk	Cycle	Public transport	Walk	Cycle	Public transport
Accra	Ghana	Africa	harmonised	81.1	0	17.8	79.5	1.2	19.3
Kisumu	Kenya	Africa	harmonised	76.2	3.7	18.4	69.6	10.9	19.5
Cape Town	South Africa	Africa	harmonised	65.6	0.4	31.8	69.1	1	29.9
Delhi	India	Asia	reported	90.5	1.5	6.6	61.2	21.3	16.4
Melbourne	Australia	Australia	reported	60.4	6.9	31.2	53.4	14.3	30.4
London	England	Europe	reported	62.2	3	30.7	51.4	10	34.5
Berlin	Germany	Europe	harmonised	47.5	23.1	27.4	46.3	27.7	26
Cologne	Germany	Europe	harmonised	57.9	22.9	16.6	50.3	30.3	19.3
Hamburg	Germany	Europe	harmonised	52.8	22.3	22.6	47.6	27.8	24.6
Munich	Germany	Europe	harmonised	46.3	25.9	25.7	43.5	30.5	26
Zurich	Switzerland	Europe	reported	75.1	8.1	14.5	71.3	12.5	14.2
Buenos Aires	Argentina	Latin America	harmonised	44	2.7	51.3	36.9	8.3	54.7
Sao Paulo	Brazil	Latin America	reported	48.6	0.3	42.2	44.2	3.4	39.8
Santiago	Chile	Latin America	harmonised	47.4	3.9	46.1	39.8	13.9	46.3
Bogota	Colombia	Latin America	reported	67.2	6.5	23.4	49.1	28	19.2
Mexico City	Mexico	Latin America	reported	63.9	1.8	33.2	43.5	8.2	47.2
Chicago	USA	North America	reported	72.6	4.1	20.5	66.7	10.5	20.2
Los Angeles	USA	North America	reported	70.8	5.6	22.3	59.5	18.7	20.6
New York City	USA	North America	reported	51	1.7	42.9	48.9	3.6	41.9

Table A16: Percentage contribution to total active travel time by different main modes for children

City	Country	Region	Active travel for public transport	Children (female)			Children (male)		
				Walk	Cycle	Public transport	Walk	Cycle	Public transport
Accra	Ghana	Africa	harmonised	93.7	NA	6.1	92.2	1.1	6.7
Kisumu	Kenya	Africa	harmonised	89.4	2.1	7.4	87.4	5.7	7
Cape Town	South Africa	Africa	harmonised	81.5	NA	17.2	84.1	0.2	15.7
Delhi	India	Asia	reported	93.5	1.3	4.2	89.2	2.6	6.1
Melbourne	Australia	Australia	reported	66.2	7.3	26.1	62.8	8.8	27.9
London	England	Europe	reported	66.5	1.8	27.7	62.4	6.3	27.3
Berlin	Germany	Europe	harmonised	47.2	31.9	19.1	44.6	36.5	18.9
Cologne	Germany	Europe	harmonised	61.1	23.5	13.4	54.4	30.6	15
Hamburg	Germany	Europe	harmonised	55.4	28.9	13.6	51.4	35.4	13.3
Munich	Germany	Europe	harmonised	57.2	24.9	16.3	53.5	30.5	16.1
Zurich	Switzerland	Europe	reported	74.5	11.4	12.6	73.7	14.6	10.8
Buenos Aires	Argentina	Latin America	harmonised	62.2	2.1	33.9	63.8	3	33.2
Sao Paulo	Brazil	Latin America	reported	75.8	0.3	19.3	78.1	0.7	17.2
Santiago	Chile	Latin America	harmonised	66.3	3.7	27.8	70.2	5.2	24.6
Bogota	Colombia	Latin America	reported	82.8	5.3	10.6	73.1	16.2	9.6
Mexico City	Mexico	Latin America	reported	79.4	1.7	18.1	78.6	2.8	17.8
Chicago	USA	North America	reported	84.5	3.2	11.6	83.8	7.7	7.6
Los Angeles	USA	North America	reported	80.9	4.4	13.8	76	10.2	13
New York City	USA	North America	reported	60.1	1.4	36.4	61.1	2.7	31.7

Table A17: Percentage contribution to total active travel time by different main modes for working age group

City	Country	Region	Active travel for public transport	Working age group (female)			Working age group (male)		
				Walk	Cycle	Public transport	Walk	Cycle	Public transport
Accra	Ghana	Africa	harmonised	77.8	0	20.8	75.1	1.3	23.6
Kisumu	Kenya	Africa	harmonised	73.4	4	20.7	64.8	12.1	23.1
Cape Town	South Africa	Africa	harmonised	63.1	0.5	34.3	64.9	0.8	34.3
Delhi	India	Asia	reported	88.7	1.3	8.4	49	29.7	21.3
Melbourne	Australia	Australia	reported	56.8	7.3	34.2	47.2	16.6	34
London	England	Europe	reported	60.6	3.5	31.9	47.2	11.9	37.4
Berlin	Germany	Europe	harmonised	37.6	26.6	33.7	40	29.2	30.9
Cologne	Germany	Europe	harmonised	51.4	27.4	18.6	42.7	33.8	23.5
Hamburg	Germany	Europe	harmonised	48.3	22.9	26.4	41.7	27.7	30.6
Munich	Germany	Europe	harmonised	40.4	27.9	29.4	37	32.4	30.7
Zurich	Switzerland	Europe	reported	71.2	9	17.3	64.7	14.3	18.4
Buenos Aires	Argentina	Latin America	harmonised	37.4	3.2	57.6	22.9	10.6	66.5
Sao Paulo	Brazil	Latin America	reported	41	0.3	48.9	30.7	4.8	49.1
Santiago	Chile	Latin America	harmonised	40.1	4.8	52.4	28.4	17.1	54.5
Bogota	Colombia	Latin America	reported	61	8.2	27.6	37	35.9	23
Mexico City	Mexico	Latin America	reported	58.8	2	38.1	27.2	10.3	61.6
Chicago	USA	North America	reported	66.5	4.6	25	57.5	12.5	26.6
Los Angeles	USA	North America	reported	66.9	6.3	25.7	50.9	23.7	24.4
New York City	USA	North America	reported	48.5	2.1	45	45	4.1	46.1

Table A18: Percentage contribution to total active travel time by different main modes for older adults

City	Country	Region	Active travel for public transport	Older adults (female)			Older adults (male)		
				Walk	Cycle	Public transport	Walk	Cycle	Public transport
Accra	Ghana	Africa	harmonised	44	0	53.7	71.5	0	28.5
Kisumu	Kenya	Africa	harmonised	73.4	2.8	22.5	85.8	7.8	6.3
Cape Town	South Africa	Africa	harmonised	50.1	NA	44.1	52.5	9.7	37.8
Delhi	India	Asia	reported	81.3	NA	18.7	83.2	3.6	13.3
Melbourne	Australia	Australia	reported	70.8	4.9	22.8	69.3	10.7	17.3
London	England	Europe	reported	66.3	1.4	27.6	62.1	3.9	28.6
Berlin	Germany	Europe	harmonised	68.2	10.9	19.3	63.2	19	17.7
Cologne	Germany	Europe	harmonised	74.4	9.8	13.3	68.7	20.9	10.4
Hamburg	Germany	Europe	harmonised	63.3	17.2	17.2	62.4	22.4	15.3
Munich	Germany	Europe	harmonised	54.8	21.4	22	54.7	25.5	19.8
Zurich	Switzerland	Europe	reported	85.6	4.2	8.4	85	7.3	6.2
Buenos Aires	Argentina	Latin America	harmonised	46	1.3	49.5	40.8	10.7	48.5
Sao Paulo	Brazil	Latin America	reported	41.9	NA	44.9	46.9	0.9	35
Santiago	Chile	Latin America	harmonised	56.6	0.5	40.5	45.6	12.5	41.9
Bogota	Colombia	Latin America	reported	76.9	0.5	18.9	63.6	13.1	19.9
Mexico City	Mexico	Latin America	reported	69.7	0.4	28.4	49.7	9.5	39.4
Chicago	USA	North America	reported	77.5	3.5	16.4	73.1	6.9	17.5
Los Angeles	USA	North America	reported	75.8	1.9	20.1	67	12	18.9
New York City	USA	North America	reported	53.5	0.3	40.4	52.8	1.7	36.5

Table A19: Harmonised active travel time per capita per day (*indicates cities for which stage-level travel time was estimated using harmonisation process)

City	Country	Region	Active travel for public transport	All age groups combined		Children		Working age group		Older adults	
				Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	harmonised	47.8	49.2	63.8	54.4	47.1	49.1	12.4	34.8
Kisumu	Kenya	Africa	harmonised	22.9	22.4	13.2	13.7	25.7	25.0	35.0	66.8
Cape Town	South Africa	Africa	harmonised	22.3	19.9	29.1	31.8	25.6	21.1	5.5	4.6
Delhi*	India	Asia	reported	14.1	21.1	19.4	18.6	12.0	23.2	4.9	11.4
Melbourne*	Australia	Australia	reported	10.5	10.7	8.8	8.7	11.7	11.9	8.2	9.5
London*	England	Europe	reported	23.0	20.5	14.6	12.8	27.1	23.9	19.0	19.3
Berlin	Germany	Europe	harmonised	34.8	32.2	31.9	26.1	35.3	33.0	35.0	35.1
Cologne	Germany	Europe	harmonised	34.5	30.3	34.6	25.8	37.3	30.9	28.7	32.6
Hamburg	Germany	Europe	harmonised	34.7	31.8	30.9	30.5	37.5	33.2	30.9	29.2
Munich	Germany	Europe	harmonised	36.0	33.4	36.4	31.1	36.7	33.4	34.3	35.5
Zurich*	Switzerland	Europe	reported	38.1	35.7	39.6	41.8	38.5	32.4	36.6	42.1
Buenos Aires	Argentina	Latin America	harmonised	16.9	14.3	14.4	14.2	19.9	15.1	11.1	11.1
Sao Paulo*	Brazil	Latin America	reported	18.8	18.7	18.4	18.4	21.2	20.2	9.4	11.6
Santiago	Chile	Latin America	harmonised	19.1	17.7	14.9	15.6	21.1	18.5	17.7	18.1
Bogota*	Colombia	Latin America	reported	24.0	22.9	19.9	20.0	26.2	23.6	21.3	24.9
Mexico City*	Mexico	Latin America	reported	16.5	14.0	14.0	14.3	18.2	14.1	12.4	12.7
Chicago*	USA	North America	reported	5.5	5.2	5.6	5.0	5.9	5.7	4.1	4.0
Los Angeles*	USA	North America	reported	10.5	10.6	14.1	13.8	10.8	10.2	5.6	8.2
New York City*	USA	North America	reported	33.3	32.6	25.8	23.8	37.0	36.6	25.6	30.6

Table A20: Harmonised active travel time per capita per day using active travel time values from homogenous groups of the cities (*indicates cities for which stage-level travel time was estimated using harmonisation process)

				All age groups combined		Children		Working age group		Older adults	
City	Country	Region	Active travel for public transport	Female	Male	Female	Male	Female	Male	Female	Male
Accra	Ghana	Africa	harmonised	47.5	48.5	63.7	54.1	46.8	48.2	12.2	34.0
Kisumu	Kenya	Africa	harmonised	22.9	22.0	13.2	13.6	25.7	24.5	34.8	66.4
Cape Town	South Africa	Africa	harmonised	22.7	19.6	29.4	31.4	26.0	20.7	5.8	4.5
Delhi*	India	Asia	reported	14.1	21.1	19.4	18.6	12.0	23.2	4.9	11.4
Melbourne*	Australia	Australia	reported	10.5	10.7	8.8	8.7	11.7	11.9	8.2	9.5
London*	England	Europe	reported	23.0	20.5	14.6	12.8	27.1	23.9	19.0	19.3
Berlin	Germany	Europe	harmonised	35.0	31.7	32.2	25.7	35.3	32.3	35.3	34.6
Cologne	Germany	Europe	harmonised	35.1	29.8	35.1	25.5	38.0	30.4	29.3	32.3
Hamburg	Germany	Europe	harmonised	35.1	31.3	31.4	30.2	38.0	32.5	31.4	28.9
Munich	Germany	Europe	harmonised	36.2	32.7	36.7	30.7	36.8	32.5	34.5	34.9
Zurich*	Switzerland	Europe	reported	38.1	35.7	39.6	41.8	38.5	32.4	36.6	42.1
Buenos Aires	Argentina	Latin America	harmonised	16.7	13.8	14.3	13.8	19.6	14.5	10.9	10.7
Sao Paulo*	Brazil	Latin America	reported	18.8	18.7	18.4	18.4	21.2	20.2	9.4	11.6
Santiago	Chile	Latin America	harmonised	18.8	16.9	15.0	15.3	20.7	17.5	17.5	17.3
Bogota*	Colombia	Latin America	reported	24.0	22.9	19.9	20.0	26.2	23.6	21.3	24.9
Mexico City*	Mexico	Latin America	reported	16.5	14.0	14.0	14.3	18.2	14.1	12.4	12.7
Chicago*	USA	North America	reported	5.5	5.2	5.6	5.0	5.9	5.7	4.1	4.0
Los Angeles*	USA	North America	reported	10.5	10.6	14.1	13.8	10.8	10.2	5.6	8.2
New York City*	USA	North America	reported	33.3	32.6	25.8	23.8	37.0	36.6	25.6	30.6

Table A21: Percent individuals achieving at least 30 minutes of active travel time for cities that reported stage-level travel time

City	Country	Region	All age groups combined		Children		Working age group		Older adults	
			Female	Male	Female	Male	Female	Male	Female	Male
Delhi	India	Asia	24.0	33.0	32.7	32.9	20.3	33.9	13.4	23.0
Melbourne	Australia	Australia	15.9	15.7	12.8	12.1	17.7	17.5	13.5	14.1
London	England	Europe	27.4	25.6	16.8	15.4	33.0	30.1	21.5	23.7
Zurich	Switzerland	Europe	42.0	39.0	48.1	46.5	41.7	36.5	40.1	42.3
Sao Paulo	Brazil	Latin America	26.3	25.7	26.1	26.5	29.6	27.4	12.7	14.9
Bogota	Colombia	Latin America	27.0	23.5	25.3	24.1	28.0	23.1	25.3	24.6
Mexico City	Mexico	Latin America	25.6	21.5	23.1	23.5	27.7	21.1	19.8	19.3
Chicago	USA	North America	6.3	5.8	5.4	4.7	7.1	6.7	5.4	4.7
Los Angeles	USA	North America	12.1	11.8	14.5	15.7	12.4	11.2	7.5	8.6
New York City	USA	North America	37.1	35.7	30.4	29.2	41.5	39.3	26.6	29.5