

# Walking and Cycling Index 2023

## Data sources and methodologies

---

March 2024

To find out more, please contact: Dunja Reed  
[Dunja.Reed@sustrans.org.uk](mailto:Dunja.Reed@sustrans.org.uk)

---

We work for and with communities, helping them come to life by walking, wheeling and cycling to create healthier places and happier lives for everyone. [www.sustrans.org.uk](http://www.sustrans.org.uk)

Registered charity no. 326550 (England and Wales)  
SC039263 (Scotland).

<b>Category</b>	<b>Details</b>
<b>Reference ID:</b>	SUSR2211
<b>Version:</b>	2.0
<b>Client:</b>	Public
<b>Circulation status:</b>	External
<b>Issue date:</b>	05/03/2024
<b>Author(s):</b>	Jessica Cessford, Holly Musgrove, Ralph Hughes
<b>Reviewed by:</b>	Dunja Reed, Dene Stevens, Mathilda Heyman
<b>Signed off by:</b>	Dunja Reed
<b>Accepted by:</b>	Dunja Reed
<b>Contact:</b>	Dunja.Reed@sustrans.org.uk

# Contents

<b>Contents</b> .....	<b>2</b>
<b>Data sources overview</b> .....	<b>3</b>
Where does the data in the 2023 Walking and Cycling Index reports come from? .....	3
<b>Data sources and methodologies</b> .....	<b>6</b>
Interpretation of survey data.....	6
Page 2 and 3: Foreword.....	8
Page 4 and 5: Headlines .....	9
Pages 6 and 7: Walking in [city] .....	15
Pages 8 and 9: Cycling in [city] .....	18
Pages 10 and 11: Benefits of walking .....	20
Pages 12 and 13: Benefits of cycling .....	45
Pages 14 and 15: Walking solutions .....	63
Pages 16 and 17: Cycling solutions .....	72
Pages 18 and 19: Neighbourhood solutions .....	81
Pages 20 and 21: Developing [city].....	88
Pages 22 and 23: Looking forward.....	89
<b>Appendices</b> .....	<b>90</b>
Appendix A: Participating cities .....	90
Appendix B: Independent resident survey - methodology.....	93
Appendix C: Survey questionnaire .....	96
Appendix D: The Walking and Cycling modelling process .....	116

# Data sources overview

## Where does the data in the 2023 Walking and Cycling Index reports come from?

The 23 Walking and Cycling Index (abbreviated as ‘The Index’) reports for 2023 were produced by Sustrans with the support and co-operation of the authorities named on the front cover of each report. The participating cities, metropolitan areas and boroughs in the UK and Ireland for 2023 were: Aberdeen, Belfast, Birmingham, Bristol, Cardiff, Cork Metropolitan Area, Dublin Metropolitan Area, Dundee, Dunfermline, Edinburgh, Galway Metropolitan Area, Glasgow, Greater Cambridge, Greater Manchester, Inverness, Limerick Shannon Metropolitan Area, Liverpool City Region, Perth, Southampton City Region, Stirling, Tower Hamlets, Tyneside, and Waterford Metropolitan Area<sup>1</sup>. The term ‘city’ is used as shorthand for all areas.

Data was collated in, and in most cases applies to, 2023. However, in a minority of cases some data is drawn from previous years where 2023 figures were not available. All reports were published in March 2024.

The data contained in the reports are drawn from a set of common data outputs reviewed and agreed by Sustrans and the partner authorities. There are four categories of data:

---

<sup>1</sup> [Appendix A](#) outlines the Index participating cities since the project started in 2015.

## Settings data

These are objective measures of the current environment for walking, wheeling, and cycling. They include:

- Measures made from online geographic sources including the percentage of households within specific distances of everyday amenities, pavement widths alongside roads and neighbourhood housing density.
- Data supplied by the partner authorities of what is available to help someone walk, wheel or cycle<sup>2</sup>, and other related walking and cycling data including cycle thefts.

## Attitude and perception data

General attitudes and perceptions of the public towards walking, wheeling, cycling and transport. This includes:

- types of interventions/ facilities/ equipment that would encourage respondents to walk, wheel and cycle more;
- perceptions of existing infrastructure;
- views on safety;
- views on public investment on specific interventions to support walking, wheeling or cycling, and
- views on levels of government spending on different transport modes.

This data is collected in the independent representative survey in each city. Perception data were collected for all survey participants, not just for those who walk, wheel and cycle.

## Behaviour data

Demand-side measures of residents' travel behaviours, the types of people who are walking, wheeling, and cycling, how

---

<sup>2</sup> Where applicable, 2021 comparison data is also presented in the reports. In some cases, data from 2021 has been re-calculated following the identification of errors during the 2023 iteration and these are presented in the 2023 reports. In a small number of cases 2021 data has been omitted from the reports if it was not possible to re-calculate.

often, how far, and to which types of destination. This data was collected in an independent representative survey in each city. Behaviour data were collected for all survey participants, not just for those who walk, wheel and cycle.

## **Impact data**

Health, economic, and environmental benefits from walking, wheeling<sup>3</sup> and cycling This includes modelled economic benefits, premature deaths prevented, impacts for the NHS (HSE in the Republic of Ireland) and reductions in pollutants where people walk, wheel, or cycle instead of using cars.

This data is calculated by Sustrans' Research and Monitoring Unit from a combination of the behavioural data and the best available evidence. For more information see [Appendix D](#).

---

<sup>3</sup> Survey participants were instructed to consider walking to also include wheeling (the use of wheelchairs and mobility scooters). However, all other source data used as model inputs relate only to walking. This is primarily due to the lack of available data on wheeling.

# Data sources and methodologies

The following sections outline the data sources and methodologies behind each data point in each city report.

We recognise that some people who use wheeled mobility aids, for example a wheelchair or a mobility scooter, may not identify with the term walking and prefer to use the term wheeling. We use the terms walking and wheeling together to ensure we are as inclusive as possible. Therefore, all walking survey responses within the reports include responses from people who wheel.

Throughout the report we have included comparisons to 2021 survey data where available and comparable for the city. The 2019 pre-pandemic iteration of the Index (then called 'Bike Life') covered cycling but not walking. For available 2019 comparisons, see the respective 2019 reports.

## Interpretation of survey data

As a sample and not the entire population has been interviewed, results are subject to sampling tolerances, which mean that not all differences are statistically significant.

We can predict the variation between the sample results and the 'true' values (if everyone in the population had been interviewed) from the knowledge of the sample size on which the results are based, and the number of times answers are given. The confidence with this prediction is usually chosen to be 95%, in that the 'true' value will fall within a specified range 95 times out of 100. Table 1

outlines the predicted ranges for different sample sizes and the percentage results at the 95% confidence level.

For example, with a sample size of 1,100 interviews where 50% give a particular answer, we can still be 95% certain that the 'true' value will fall within the range of 47% and 53% (+/- 3.0% of the findings).

---

**Table 1: Sampling Tolerances**

<b>Sample size</b>	<b>10% or 90% + / -</b>	<b>30% or 70% + / -</b>	<b>50% + / -</b>
100	5.9%	9.0%	9.8%
300 (approximate number of cyclists interviewed per city)	3.4%	5.2%	5.7%
500	2.6%	4.0%	4.4%
700	2.1%	3.3%	3.6%
1,000	1.9%	2.9%	3.2%
1,100	1.8%	2.8%	3.0%
1,200	1.7%	2.6%	2.8%
1,300	1.6%	2.5%	2.7%
1,400	1.6%	2.4%	2.6%
1,500	1.5%	2.3%	2.5%

The full sample size in each city is between 1,071 and 1,338. The tolerances for smaller samples in the table above are relevant to subsets of the main samples.

See [Appendix B](#) and [C](#) for further information on the representative survey delivered in each city and the questionnaire used.



## Page 2 and 3: Foreword

### Our vision for walking, wheeling, and cycling in the city (page 2)

Data item	Sources and notes
Various data, depending on each individual city report	Section written by the partner authority. Figures come from data sourced from the Walking and Cycling Index report, or from data sourced separately by the partner authority.

### The Walking and Cycling Index (page 3)

Data item	Sources and notes
Number of residents surveyed	Number of residents who completed the independent survey of residents conducted by NatCen in the UK and Behaviour & Attitudes in the Republic of Ireland.

## Page 4 and 5: Headlines

### Population (page 4)

Data item	Sources and notes
Population	<p>This is the total population of the city (adults and children), based on the most recent available data for the Index city boundaries.</p> <ul style="list-style-type: none"><li>• England and Wales: Census 2021 (Office of National Statistics)</li><li>• Scotland: 2021 mid-year population estimates (National Records of Scotland)</li><li>• Belfast: 2022 mid-year population estimates (Northern Ireland Statistics and Research Agency)</li><li>• Republic of Ireland: Census 2022 (Central Statistics Office Ireland)</li></ul>

### The impact of the pandemic (page 4)

Data item	Sources and notes
<p>Percentage of residents who travel five days or more a week by (chart):</p> <ul style="list-style-type: none"><li>• walking or wheeling</li><li>• driving</li><li>• public transport</li><li>• cycling</li></ul>	<p>The percentage of respondents answering '7 days a week' or '5-6 days a week' to Q2c, Q2a/b combined, Q2f and Q2e in the independent survey of residents.</p> <p>Driving includes travelling as driver and passenger in either a car, van, or motorcycle.</p> <p><i>2021 and 2019 data from corresponding 2021 and 2019 survey questions for all available cities. In 2019, the survey question did not include traveling by motorcycle.</i></p>

Data item	Sources and notes
Percentage of residents who walk or wheel at least five days a week	See explanations for <a href="#">page 6</a> of the Index report for exact question.
Percentage of residents who cycle at least once a week	See explanations for <a href="#">page 8</a> of the Index report for exact question.

## Walking, wheeling, and cycling participation is not equal (page 4)

Data item	Sources and notes
Proportion of residents who walk or wheel at least five days a week	Each city selected which demographics to present in their headlines. See <a href="#">page 6</a> of the Index report for the exact question and available demographics.
Proportion of residents who cycle at least once a week	Each city selected which demographics to present in their headlines. See <a href="#">page 8</a> of the Index report for the exact question and available demographics.

## Not all residents feel safe and welcome in their neighbourhood (page 4)

Data item	Sources and notes
Proportion of residents who think walking and wheeling safety is good	Each city selected which demographics to present in their headlines. See <a href="#">page 7</a> of the Index report for the exact question and available demographics.
Proportion of residents who think cycling safety is good	Each city selected which demographics to present in their headlines.

Data item	Sources and notes
	See <a href="#">page 9</a> of the Index report for the exact question and available demographics.
Proportion of residents who feel welcome and comfortable walking, wheeling or spending time on the streets of their neighbourhood	Each city selected which demographics to present in their headlines.  See <a href="#">page 18</a> of the Index report for the exact question and available demographics.

## Everyone benefits when more people walk, wheel and cycle (page 5)

Data item	Sources and notes
Number of cars taken off the road daily	<p>Combined figure for walking, wheeling, and cycling.</p> <p>Total return walking, wheeling, and cycling trips made daily that could have been driven.</p> <p>Walking, wheeling, and cycling trips that could have been driven are trips to a destination (that is, non-leisure trips) by adults who have at least one car or van in their household (from Q1 of the independent survey of residents). To get daily trips, the total annual trips were divided by 365 and to get return trips, these were divided by 2.</p> <p>See explanations for <a href="#">page 10</a> and <a href="#">12</a> of the Index report for the number of walking and wheeling trips in the city in the past year and the number of cycle trips in the city in the past year, respectively.</p>
Number of serious long-term health conditions prevented annually	<p>Combined for walking and cycling.</p> <p>See explanations for <a href="#">page 11</a> and <a href="#">13</a> of the Index report for walking and cycling conditions.</p>

Data item	Sources and notes
Economic benefit created for individuals and the city annually	<p>Combined for walking, wheeling, and cycling.</p> <p>See explanations for <a href="#">pages 10</a> and <a href="#">12</a> of the report for the net annual economic benefit for individuals and society from all walking and wheeling trips and the net annual economic benefit for individuals and society from all cycling trips, respectively.</p>
Tonnes of greenhouse gas emissions saved annually	<p>Combined for walking, wheeling and cycling.</p> <p>See explanations for <a href="#">pages 11</a> and <a href="#">13</a> of the report for walking and wheeling and cycling savings, respectively.</p>

## Residents want to walk, wheel and cycle more and drive less (page 5)

Data item	Sources and notes
Percentage of residents who would like to walk or wheel, cycle, take public transport or drive more or less in the future	The percentage of all respondents answering 'more than now' to Q15a_a, Q15a_c, Q15a_d and Q15a_b in the independent survey of residents and the percentage of all respondents indicating in Q2c, Q2e, Q2f or Q2a that they use the relevant transport mode and answering 'less than now' to Q15a_a, Q15a_c, Q15a_d and Q15a_b in the independent survey of residents.
Percentage of residents who often use a car because there are no other transport options available	The percentage of respondents answering 'often' to Q15b_e in the independent survey of residents.

## Residents want more funding for walking, wheeling, cycling and public transport (page 5)

Data item	Sources and notes
<p>Percentage of residents who would like to see more government spending in their local area on:</p> <ul style="list-style-type: none"> <li>walking and wheeling</li> <li>cycling</li> <li>public transport</li> <li>driving</li> </ul>	<p>The percentage of respondents giving these answers to Q21a, Q21b, Q21c, Q21d in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey question for all available cities.</i></p>

## Increased funding would help support more liveable neighbourhoods (page 5)

Data item	Sources and notes
Percentage of residents who support and oppose building more cycle paths along roads, physically separated from traffic and pedestrians	The percentage of respondents answering 'strongly support' or 'tend to support' and 'strongly oppose' or 'tend to oppose' to Q18 in the independent survey of residents.
Percentage of residents who support and oppose the creation of more 20-minute neighbourhoods	The percentage of respondents answering 'strongly support' or 'tend to support' and 'strongly oppose' or 'tend to oppose' to Q20 in the independent survey of residents.
Percentage of residents who support and oppose the creation of more low traffic neighbourhoods	The percentage of respondents answering, 'strongly support' or 'tend to support' and 'strongly oppose' or 'tend to oppose' to Q19 in the independent survey of residents.

Data item	Sources and notes
	The questionnaire defined Low traffic neighbourhoods as groups of streets, bordered by main roads, where 'through' motor vehicle traffic is greatly reduced. Residents still have access to all parts by car.
Percentage of residents who agree and disagree that increasing space for people socialising, walking, wheeling, and cycling on their local high street (main street for the Republic of Ireland) would improve their local area	The percentage of respondents answering 'strongly agree' or 'tend to agree' and 'strongly disagree' or 'tend to disagree' to Q17d in the independent survey of residents.
Percentage of residents who support and oppose the banning of vehicles parking on the pavement (footpath for the Republic of Ireland)	The percentage of respondents answering 'strongly support' or 'tend to support' and 'strongly oppose' or 'tend to oppose' to Q15c_a in the independent survey of residents.
Percentage of residents who support and oppose the shifting of investment from road building schemes to fund walking, wheeling, cycling and public transport	The percentage of respondents answering 'strongly support' or 'tend to support' and 'strongly oppose' or 'tend to oppose' to Q15c_f in the independent survey of residents.

## Pages 6 and 7: Walking in [city]

### Walking and wheeling participation (page 6)

Data item	Sources and notes
Percentage of all residents who walk or wheel	<p>The percentage of respondents choosing any frequency other than 'never' for Q2c in the independent survey of residents.</p> <p><i>2021 data from the corresponding 2021 survey question for all available cities.</i></p>
Percentage of residents who walk or wheel at least five days a week	<p>The percentage of respondents answering '7 days a week' or '5-6 days a week' to Q2c in the independent survey of residents.</p> <p><i>2021 data from the corresponding 2021 survey question for all available cities.</i></p>
Proportion of residents who walk or wheel at least five days a week within different demographic subgroups: <ul style="list-style-type: none"> <li>• gender and sexuality</li> <li>• ethnicity</li> <li>• age</li> <li>• disability</li> <li>• socio-economic group</li> </ul>	<p>The percentage of respondents of these gender and sexuality, ethnicity, age, disability, and socio-economic demographic subgroups (Q25a, Q25b and Q26, Q28, Q23, Q34 and Q27) answering '7 days a week' or '5-6 days a week', to Q2c in the independent survey of residents.</p> <p>Republic of Ireland: the report contains data on gender, but not sexuality, as Q25b ('Do you identify as trans?') was not included in the questionnaire. Therefore, the LGBTQ+ subgroup results could not be calculated.</p> <p><i>2021 data from the corresponding 2021 survey questions for all available cities. No 2021 comparison given for LGBTQ+ because only LGBQ+ (not Trans) was measured in 2021.</i></p>



## Walking and wheeling safety and satisfaction (page 7)

Data item	Sources and notes
Percentage of residents who think the level of safety for walking or wheeling is good	<p>The percentage of respondents answering ‘very good’ or ‘fairly good’ to Q14c in the independent survey of residents.</p> <p><i>2021 data from the corresponding 2021 survey question for all available cities.</i></p>
Percentage of residents who think the level of safety for children walking or wheeling is good	<p>The percentage of respondents answering ‘very good’ or ‘fairly good’ to Q14d in the independent survey of residents.</p> <p><i>2021 data from the corresponding 2021 survey question for all available cities.</i></p>
Percentage of residents who think their local area overall is a good place to walk or wheel	<p>The percentage of respondents answering ‘very good’ or ‘fairly good’ to Q14a in the independent survey of residents.</p> <p><i>2021 data from the corresponding 2021 survey question for all available cities.</i></p>
<p>Proportion of residents who think walking or wheeling safety in their local area is good within different demographic subgroups:</p> <ul style="list-style-type: none"> <li>• gender and sexuality</li> <li>• ethnicity</li> <li>• age</li> <li>• disability</li> <li>• socio-economic group</li> </ul>	<p>The percentage of respondents of these gender and sexuality, ethnicity, age, disability, and socio-economic demographic subgroups (Q25a, Q25b and Q26, Q28, Q23, Q34 and Q27) answering ‘very good’ or ‘fairly good’ to Q14c in the independent survey of residents.</p> <p>Republic of Ireland: the report contains data on gender, but not sexuality, as Q25b (‘Do you identify as trans?’) was not included in the questionnaire. Therefore, the LGBTQ+ subgroup results could not be calculated.</p> <p><i>2021 data from the corresponding 2021 survey questions for all available cities. No 2021 comparison given for LGBTQ+ because only LGBQ+ (not Trans) was measured in 2021.</i></p>

Data item	Sources and notes
<p>*Percentage of residents who have often felt anxious or unsafe while walking or wheeling over the last year</p> <p>Birmingham only</p>	<p>The percentage of respondents answering 'often' to Q15b_c in the independent survey of residents.</p>
<p>Story from a city resident</p>	<p>Case studies from local city residents were sourced from local contacts.</p>

## Pages 8 and 9: Cycling in [city]

### Cycling participation (page 8)

Data item	Sources and notes
Percentage of residents who cycle at least once a week (regularly; in text and standalone data point)	<p>The percentage of respondents answering, '7 days a week', '5-6 days a week', '2-4 days a week' or 'once a week' to Q2e in the independent survey of residents.</p> <p><i>2021 data from the corresponding 2021 survey question for all available cities.</i></p>
Percentage of all residents who cycle	<p>The percentage of respondents choosing any frequency other than 'never' for Q2e in the independent survey of residents.</p> <p><i>2021 data from the corresponding 2021 survey question for all available cities.</i></p>
<p>Proportion of residents who cycle at least once a week within different demographic subgroups:</p> <ul style="list-style-type: none"> <li>• gender and sexuality</li> <li>• ethnicity</li> <li>• age</li> <li>• disability</li> <li>• socio-economic group</li> </ul>	<p>The percentage of respondents of these gender and sexuality, ethnicity, age, disability, and socio-economic demographic subgroups (Q25a, Q25b and Q26, Q28, Q23, Q34, Q27) answering '7 days a week', '5-6 days a week', '2-4 days a week' or 'once a week' to Q2e in the independent survey of residents.</p> <p>Republic of Ireland: the report contains data on gender, but not sexuality, as Q25b ('Do you identify as trans?') was not included in the questionnaire. Therefore, the LGBTQ+ subgroup results could not be calculated.</p> <p><i>2021 data from the corresponding 2021 survey questions for all available cities. No 2021 comparison given for LGBTQ+ because only LGBQ+ (not Trans) was measured in 2021.</i></p>

## Cycling safety and satisfaction (page 9)

Data item	Sources and notes
Percentage of residents who think the level of safety for cycling in their local area is good	<p>The percentage of respondents answering ‘very good’ or ‘fairly good’ to Q14e in the independent survey of residents.</p> <p><i>2021 data from the corresponding 2021 survey question for all available cities.</i></p>
Percentage of residents who think the level of safety for children cycling is good	<p>The percentage of respondents answering ‘very good’ or ‘fairly good’ to Q14f in the independent survey of residents.</p> <p><i>2021 data from the corresponding 2021 survey question for all available cities.</i></p>
Percentage of residents who think their local area overall is a good place to cycle	<p>The percentage of respondents answering ‘very good’ or ‘fairly good’ to Q14b in the independent survey of residents.</p> <p><i>2021 data from the corresponding 2021 survey question for all available cities.</i></p>
<p>Proportion of residents who think cycling safety in their local area is good within different demographic subgroups:</p> <ul style="list-style-type: none"> <li>• gender and sexuality</li> <li>• ethnicity</li> <li>• age</li> <li>• disability</li> <li>• socio-economic group</li> </ul>	<p>The percentage of respondents of these gender and sexuality, ethnicity, age, disability, and socio-economic demographic subgroups (Q25a, Q25b and Q26, Q28, Q23, Q34, Q27) answering ‘very good’ or ‘fairly good’ to Q14e in the independent survey of residents.</p> <p>Republic of Ireland: the report contains data on gender, but not sexuality, as Q25b (‘Do you identify as trans?’) was not included in the questionnaire. Therefore, the LGBTQ+ subgroup results could not be calculated.</p> <p><i>2021 data from the corresponding 2021 survey questions for all available cities. No 2021 comparison given for LGBTQ+ because only LGBQ+ (not Trans) was measured in 2021.</i></p>
Story from a city resident	Case studies from local city residents were sourced from local contacts.

## Pages 10 and 11: Benefits of walking

### Annual walking and wheeling trips by purpose (page 10)

Data item	Sources and notes
The number of times per day city residents walk or wheel the equivalent times around the world	Miles (km for the Republic of Ireland) walked or wheeled per day (below) divided by the equatorial circumference of the Earth (24,901 miles / 40,075 km).
*The number of times per day city residents walk or wheel the equivalent length of Great Britain  Dunfermline, Dundee, Inverness, Perth, and Stirling only	Miles walked or wheeled per day (below) divided by the length of Great Britain using the <a href="#">Land's End to John O'Groats cycle route</a> (1,189 miles).
Number of walking and wheeling trips in the city in the past year	This is the sum of the total estimated number of trips walked or wheeled for all purposes. See below for how the annual walking and wheeling trips by purpose was calculated.  <i>2021 data from equivalent 2021 data for all available cities.</i>
Miles (or km for the Republic of Ireland) walked and wheeled in the city in the past year and per day	Respondents to the independent survey of residents were asked to estimate the distance of their most frequent one-way walk or wheel to a destination (Q4b), and their most frequent walk or wheel or run just for enjoyment or fitness (Q5b).  <u>Trips by children:</u> For school trips by children in the UK, an average walking trip distance was taken from National Travel Survey (NTS) 2015-2019 and for child leisure trips an average walking

Data item	Sources and notes
	<p>distance was taken from NTS 2020-21. For the Republic of Ireland, child school and leisure distances were taken from National Transport Authority (NTA) transport modelling using National Household Travel Survey (NHTS) 2022 data.</p> <p>The median trip distance (mean for trips by children) for each trip purpose was multiplied by the total number of trips walked or wheeled for that purpose, and the distances travelled across trip purposes were summed. See below for how the annual walking and wheeling trips by purpose was calculated.</p> <p>Distance per year was divided by 365 to get miles (or km) per day.</p> <p>For Edinburgh, the average walking trip distance from the 2016-2021 Scottish Household Survey data was used for all trip types.</p> <p><i>2021 data from equivalent 2021 data and corresponding 2021 survey questions. Child school and leisure trip distances from NTS 2015-19 and 2019 respectively in the UK, and NTS 2015-19 (school, England value) and NTA/NHTS (leisure, date unspecified) in the Republic of Ireland. Edinburgh: 2014-2019 Scottish Household Survey data.</i></p>
<p>*Number of days spent walking or wheeling (based on each resident walking continuously, 24 hours a day) for all yearly miles walked and</p>	<p>The total estimated miles (or kms in Republic of Ireland) walked or wheeled yearly (see above) divided by the average walking speed in miles (or kms) per hour (5.3 kmph, HEAT<sup>4</sup>) then divided by the number of hours in a day (24) and divided by the population of the city.</p>

<sup>4</sup> The Health Economic Assessment Tool ([HEAT](#)) for walking and cycling by World Health Organisation.

Data item	Sources and notes
<p>wheeled in the city</p> <p>Birmingham, Cork Metropolitan Area, Dunfermline, Galway Metropolitan Area, Limerick Shannon Metropolitan Area and Waterford Metropolitan Area only</p>	
<p>Annual walking and wheeling trips by purpose: Destination – adults only<sup>5</sup> (eg work, school, shopping)</p>	<p>This was calculated by multiplying together:</p> <ul style="list-style-type: none"> <li>• the <b>number of walkers and wheelers</b> in the adult population who walk or wheel at least once a week,</li> <li>• the <b>proportion of respondents who walk or wheel to a destination</b> from the residents survey <b>for each frequency</b> response,</li> <li>• the <b>number of trips per day</b> for that frequency response and</li> <li>• the <b>number of days walked or wheeled per year</b>.</li> </ul> <p>This was then summed and <b>seasonally adjusted</b>.</p> <p><u>The number of walkers and wheelers</u>  The number of people who walk and wheel in the adult population was calculated by multiplying the city adult (16+) population by the percentage of respondents answering '7 days a week', '5-6 days a week', '2-4 days a week' or 'once a week' to Q2c in the</p>

---

<sup>5</sup> Destination trips for Greater Manchester also includes trips by children, due to using TRADS data as an input for modelling.

Data item	Sources and notes
	<p>independent survey of residents.</p> <p><u>The proportion of respondents who walk or wheel to a destination</u>  For example, if 10% of respondents to Q4a in the independent survey of residents selected '9-10 trips', then the proportion for the frequency response '9-10' would be 0.1 (or 10%).</p> <p><u>The number of trips per day</u>  The trips per day for each range was calculated by dividing the lower end of the range by 7 (the number of days in a week). For example, the trips per day figure for 9-10 trips is 1.29 (9/7).</p> <p><u>The number of days walked or wheeled per year</u>  The total number of days that could be walked or wheeled in a year was based on the total number of days in a year (365) minus the number of days lost through sickness absence per worker per year (<a href="#">ONS, 2022</a>) for that nation/region. For the Republic of Ireland, the number of days lost through sickness is taken from the <a href="#">Common Appraisal Framework</a> (2021 update).</p> <p><u>Seasonality adjustment</u>  The calculations included a correction for seasonal variation using Sustrans' database of average seasonal variation in walking from a series of automatic counters over several years. We are able to correct with confidence for the relatively high levels of walking likely to be exhibited during the survey period of March to June (April to June in Republic of Ireland). For the Republic of Ireland, counters from across all cities in Ireland were sourced from the NTA's database.</p>



Data item	Sources and notes
	<p>A factor which takes into account people visiting two or more destinations in one trip (trip chaining) was not applied because there is a low risk of double-counting trips, since there are only two trip purposes for walking and wheeling, and they generally do not overlap.</p> <p>Note that for Greater Manchester, trip estimates were modelled from responses to the Transport for Greater Manchester Travel Diary Survey (TRADS) for the period of February 2022 to January 2023. This included the estimated number of walking trips done for the purposes of 'Commuting', 'Shopping', 'Personal business', 'Visiting friends', 'Sport and entertainment', 'Escort education' and 'Escort other', for both adults and children and for 'Education' by adults (child education trips are reported separately).</p> <p><i>2021 data from equivalent 2021 data and corresponding 2021 survey questions, using days per year from 2021 and sickness absence days from 2020 (2020 update in Republic of Ireland). Seasonal variation applied for the 2021 survey period of June to August (June to July for the Republic of Ireland). Greater Manchester used TRADS data for the period of October 2020 to September 2021.</i></p>
Annual walking and wheeling trips by purpose: School – children only	<p>This was calculated by multiplying together:</p> <ul style="list-style-type: none"> <li>• the <b>proportion of children that walk and wheel to school</b></li> <li>• the number of children within schools for that city (<b>school roll</b>)</li> <li>• the <b>number of days walked to school per year</b>, and</li> <li>• the <b>number of trips in a day</b> (two, for return trips).</li> </ul> <p>This was then seasonally adjusted for some cities, depending on whether the proportion of children that walk to school data was collected continuously or during a specific month.</p>

Data item	Sources and notes
	<p><u>The proportion of trips to school that are walked and wheeled</u>  The proportion of children that walk or wheel to school was taken from different sources depending on the city (sources below). For some cities it is unknown if wheeling is included.</p> <p><u>School roll</u>  The school roll for each city was the sum of the school roll for all schools in a city.</p> <p><u>The number of days walked to school per year</u>  This was the minimum number of school days in a year for that country, minus the number of days lost through absence from school for that region (sources below). It is assumed that pupils who ‘usually’ or ‘normally’ walk do so on every school day they attend.</p> <p><u>The number of trips in a day</u>  This was assumed to be two (to school and back again).</p> <p><u>Seasonal adjustment</u>  As above: <a href="#">Annual trips by purpose: Destination – adults only</a> (eg work, school, shopping). Seasonal adjustment was applied only for: Aberdeen, Belfast, Cardiff, Cork Metropolitan Area, Dublin Metropolitan Area, Dundee, Dunfermline, Edinburgh, Galway Metropolitan Area, Glasgow, Inverness, Limerick Shannon Metropolitan Area, Perth, Stirling, and Waterford Metropolitan Area, where the proportion of children that walk to school data was collected in a specified month.</p> <p>A factor which takes into account people visiting two or more destinations in one trip (trip chaining) was not applied because there is no risk of double-counting of child school trips</p>

Data item	Sources and notes
	<p>in the method.</p> <p>Note that for Greater Manchester, trip estimates were modelled from responses to the Transport for Greater Manchester Travel Diary Survey (TRADS) for the period of February 2022 to January 2023. This was comprised of the estimated number of walking and wheeling trips done for the purpose of 'Education' by children 15 and under.</p> <p><b>Sources used</b></p> <p>School days in a year:</p> <ul style="list-style-type: none"> <li>• England: <a href="#">Length of the School Week Non-Statutory Guidance (DfE)</a></li> <li>• Northern Ireland: <a href="#">School Optional Days and Exceptional Closure Days (DfE)</a></li> <li>• Scotland: <a href="#">Term dates (Education Scotland)</a></li> <li>• Wales: <a href="#">Guide to the Law [section 22: The school year, session times and term dates] (gov.wales)</a></li> <li>• Republic of Ireland: midpoint of the primary and post-primary minimum days: <a href="#">School terms in primary and post-primary school (Citizens Information)</a></li> </ul> <p>School absence rates:</p> <ul style="list-style-type: none"> <li>• England: 2021/22 <a href="#">Pupil absence in schools in England (Explore Education Statistics Gov.uk)</a></li> <li>• Northern Ireland: 2021/22 <a href="#">Pupil attendance (education-ni)</a></li> <li>• Scotland: 2020/21 <a href="#">School attendance and absence statistics (gov.scot)</a></li> <li>• Wales: 2021/22 <a href="#">Attendance of pupils in maintained schools (gov.wales)</a></li> <li>• Republic of Ireland: 2021/22 mean of primary and post-primary <a href="#">School Attendance Data [Table 2.2] (Tess)</a></li> </ul>

Data item	Sources and notes
	<p>School roll:</p> <ul style="list-style-type: none"> <li>• England: <a href="#">Schools, pupils and their characteristics (gov.uk)</a></li> <li>• Northern Ireland: <a href="#">School enrolments (DfE)</a></li> <li>• Scotland: <a href="#">Scottish School Roll and Locations (Scottish Government)</a></li> <li>• Wales: <a href="#">Cardiff schools (Cardiff Council)</a></li> <li>• Republic of Ireland: <a href="#">Data on Individual Schools (DfE)</a></li> </ul> <p>Proportion of children that walk and wheel to school (data supplied by partner authorities) and whether the source includes wheeling:</p> <ul style="list-style-type: none"> <li>• Belfast: Census (2021); it is unspecified if wheeling trips are counted under walking.</li> <li>• Birmingham: Modeshift STARS (2021-23); wheeling trips have been included alongside walking.</li> <li>• Bristol: Modeshift STARS (2020-23); wheeling trips have been included alongside walking.</li> <li>• Cardiff: Public Health Wales Travel to School Hands Up Survey (2022); wheeling trips have been included alongside walking.</li> <li>• Greater Cambridge: Modeshift Stars (2021/22); wheeling trips have been included alongside walking.</li> <li>• Greater Manchester: Value not used – TRADS trips used instead (see above).</li> <li>• Liverpool City Region: Living Streets WOW travel tracker (date unspecified); wheeling trips have been included alongside walking.</li> <li>• Southampton City Region: School travel survey (2022), Modeshift STARS (2023) and Hands Up Survey, Hampshire County Council (2023) combined); it is unspecified if wheeling trips are counted under walking.</li> <li>• Tower Hamlets: TfL STARS (2021-2022 and 2022-2023); wheeling trips have been</li> </ul>

Data item	Sources and notes
	<p>included alongside walking.</p> <ul style="list-style-type: none"> <li>• Tyneside: Modeshift STARS (2021/22 and 2022/23); wheeling trips have been included alongside walking.</li> <li>• Scottish cities: Hands Up Scotland Survey (2022); it is unspecified if wheeling trips are counted under walking.</li> <li>• Republic of Ireland cities: Census (2022), Usually resident by means of travel to school, college or childcare; it is unspecified if wheeling trips are counted under walking.</li> </ul> <p><i>2021 data from data sources detailed in the <a href="#">2021 methodology report</a>. Greater Manchester used TRADS data for the period of October 2020 to September 2021 for those aged 16 and under.</i></p>
Annual walking and wheeling trips by purpose: Enjoyment or fitness – adults and children (including running)	<p>This is the sum of the total estimated number of trips walked or wheeled for enjoyment or fitness by adults and children.</p> <p><u>The number of trips walked or wheeled for enjoyment by <b>adults</b></u>  This was calculated by multiplying together:</p> <ul style="list-style-type: none"> <li>• the <b>number of walkers and wheelers</b> in the adult population who walk or wheel at least once a week,</li> <li>• the <b>proportion of respondents who walk or wheel for enjoyment and fitness</b> from the residents survey for each frequency response,</li> <li>• the <b>number of trips per day</b> for that frequency response and</li> <li>• the <b>number of days walked or wheeled per year</b>.</li> </ul> <p>This is then summed and <b>seasonally adjusted</b>.</p>

Data item	Sources and notes
	<p>The calculation and inputs were the same as above: <a href="#">Annual trips by purpose: Destination – adults only</a> (eg work, school, shopping).</p> <p><u>The number of trips walked or wheeled for enjoyment by <b>children</b></u>  This was calculated by:</p> <ul style="list-style-type: none"> <li>• Calculating the adult leisure trips (as <b>Error! Reference source not found.</b>) for the subset of <b>adult walkers and wheelers who have at least one child in their household</b> (including seasonal adjustment)</li> <li>• Dividing this by the <b>number of adults with children in their household</b> to get trips per adult per year</li> <li>• Then multiplying the result by the <b>ratio of leisure walking trips per person per year</b> (adults from households with children: children) and</li> <li>• Multiplied by the child population.</li> </ul> <p><u>The number of adult walkers and wheelers with children in their household</u>  This was calculated by multiplying the proportion of respondents to the residents survey who walk or wheel at least once a week (Q5a) that have at least one child in their household (Q30) by the <b>number of walkers and wheelers</b> in the population (using the same method as above: <a href="#">Annual trips by purpose: Destination – adults only</a> (eg work, school, shopping), including seasonal adjustment).</p> <p><u>The number of adults with children in their household</u>  This was calculated by multiplying the proportion of respondents to the residents survey who have at least one child in their household (calculated from Q30 and the adult population) by the adult population.</p>

Data item	Sources and notes
	<p><u>Ratio of leisure walking trips per person per year</u> (adults from households with children: children)</p> <p>We calculated the ratio of child leisure trips (15 and under) per child per year to adult leisure trips (aged 16+) by those in households with children per adult per year, by using a custom data table from the National Travel Survey 2021. Leisure trips include the purposes 'day trip' and 'just walk' only. For the Republic of Ireland, the ratio is calculated from 2022 National Household Travel Survey data (NHTS) ('round trip' only).</p> <p>A factor which takes into account people visiting two or more destinations in one trip (trip chaining) was not applied because there is a low risk of double-counting trips, since there are only two trip purposes for walking and wheeling, and they generally do not overlap.</p> <p>Note that for Greater Manchester, trip estimates were modelled from responses to the Transport for Greater Manchester Travel Diary Survey (TRADS) for the period of February 2022 to January 2023. This was comprised of the estimated number of walking trips done for the purpose of 'Holidays and round trips' by all ages.</p> <p><i>2021 data from corresponding 2021 survey question, using a ratio calculated from NTS 2015-2019 rolling average data (NHTS 2017 data in the Republic of Ireland). Greater Manchester used TRADS data for the period of October 2020 to September 2021.</i></p>

## Walking and wheeling benefit residents and the local economy (page 10)

Data item	Sources and notes
<p>Net economic benefit to individuals and society for each mile (or km for the Republic of Ireland) walked or wheeled instead of driven</p>	<p>This is the difference between the net economic value to individuals and society for each mile (or km) walked or wheeled and the net economic value to individuals and society for each mile (or km) driven.</p> <p>The net economic value to individuals and society for each mile (or km) walked or wheeled included figures for (from largest to smallest effect): the value of time spent walking (costed as the midpoint between commuting and other non-work values), the health value (reduction in medical costs and work absenteeism), the value of additional life years, and operating costs of walking (ie shoe wear), per mile (or km).</p> <p>It was assumed that the benefits of wheeling are the same as the benefits of walking for the purposes of the Index model.</p> <p><b>Sources used</b> (adjusted to 2023 prices and, where the value year is provided in the source, 2023 values):</p> <ul style="list-style-type: none"> <li>• Value of time spent walking: value of time divided by walking speed <ul style="list-style-type: none"> <li>○ Value of time: DfT <a href="#">TAG</a> (2022), <a href="#">Transport Appraisal Framework</a> in the Republic of Ireland</li> <li>○ Walking speed: <a href="#">HEAT</a></li> </ul> </li> <li>• Health: <a href="#">Gossling et al (2019)</a></li> <li>• Prolonged life: <a href="#">Gossling et al (2019)</a></li> <li>• Vehicle operating costs: <a href="#">Gossling et al (2019)</a>.</li> </ul> <p>The net economic value to individuals and society for each mile (or km) driven included</p>



Data item	Sources and notes
	<p>figures for (from largest to smallest effect): vehicle operating costs, the value of time spent driving (costed as the midpoint between commuting and other non-work values), congestion, indirect taxation, greenhouse gases, local air quality, soil and water quality, well-to-tank emissions, noise, and infrastructure maintenance, per mile (or km).</p> <p>Where values were given dependent on city classification, cities were assigned either London, 'Inner/Outer Conurbation' or 'Other Urban' from <a href="#">TAG (A5.4)</a>. Cities not listed were assigned 'Other Urban' (including Republic of Ireland cities). Where values were given dependent on road type, a weighted average is used based on the proportion of urban traffic on A roads and other roads (excluding motorways) in Great Britain (by vehicle-kilometre) from <a href="#">Road traffic statistics</a> (2021). This applies to congestion, indirect taxation, greenhouse gases, local air quality, noise, and infrastructure maintenance (UK only).</p> <p><b>Sources used</b> (adjusted to 2023 prices and, where the value year is provided in the source, 2023 values):</p> <ul style="list-style-type: none"> <li>• Vehicle operating costs: annual cost of owning a vehicle divided by average annual mileage (kilometrage in Republic of Ireland) <ul style="list-style-type: none"> <li>○ annual cost of owning a vehicle: <a href="#">Nimblefins</a> (2022), <a href="#">AA</a> (2019) in the Republic of Ireland</li> <li>○ average annual mileage (or kilometrage): <a href="#">NTS table 0901</a> (2021), <a href="#">CSO Transport Ominibus</a> (2021) in Republic of Ireland</li> </ul> </li> <li>• Value of time spent driving: value of time divided by driving speed <ul style="list-style-type: none"> <li>○ Value of time: DfT <a href="#">TAG</a> (2022), <a href="#">Transport Appraisal Framework</a> in the Republic of Ireland</li> <li>○ Driving speed: various, depending on city (data supplied or agreed by partner authorities – where cities could not supply sufficiently accurate data, the <a href="#">DfT</a></li> </ul> </li> </ul>

Data item	Sources and notes
	<p data-bbox="947 339 1344 371"><a href="#">England average</a> was used)</p> <ul style="list-style-type: none"> <li data-bbox="994 379 1926 443">▪ Aberdeen: DfT average speed on urban 'A' roads in England – CGN0503a tab (2022)</li> <li data-bbox="994 451 1982 515">▪ Belfast: INRIX speed data linked to a HERE A and B road network average (excluding motorways) by road distance (2023 Q1 24 hr)</li> <li data-bbox="994 523 1982 587">▪ Birmingham: DfT average speed on urban 'A' roads in Birmingham (local authority) – CGN0503d tab (2022)</li> <li data-bbox="994 595 2027 659">▪ Bristol: DfT average speed on urban 'A' roads in City of Bristol (UA) – CGN0503d tab (2022)</li> <li data-bbox="994 667 1881 730">▪ Cardiff: DfT average speed on urban 'A' roads in England – CGN0503a tab (2022)</li> <li data-bbox="994 738 1899 802">▪ Dundee: DfT average speed on urban 'A' roads in England – CGN0503a tab (2022)</li> <li data-bbox="994 810 2016 874">▪ Dunfermline: Weighted average by Average Daily Traffic volume (24-hr) across 35 sites, 2022 and 2023</li> <li data-bbox="994 882 1937 946">▪ Edinburgh: DfT average speed on urban 'A' roads in England – CGN0503a tab (2022)</li> <li data-bbox="994 954 1915 1018">▪ Glasgow: DfT average speed on urban 'A' roads in England – CGN0503a tab (2022)</li> <li data-bbox="994 1026 2033 1090">▪ Greater Cambridge: DfT average speed on urban 'A' roads in England – CGN0503a tab (2022)</li> <li data-bbox="994 1098 2004 1161">▪ Greater Manchester: Average speed on local 'A' roads, B roads and minor across 24-hours, from DfT data (2022)</li> <li data-bbox="994 1169 1926 1233">▪ Inverness: DfT average speed on urban 'A' roads in England – CGN0503a tab (2022)</li> <li data-bbox="994 1241 1937 1305">▪ Liverpool City Region: DfT average speed on urban 'A' roads in</li> </ul>

Data item	Sources and notes
	<ul style="list-style-type: none"> <li>▪ Liverpool City Region - CGN0503c tab (2022)</li> <li>▪ Perth: Average of 9 SfP sites 7-day 24-hr (2021)</li> <li>▪ Southampton City Region: DfT average speed on urban 'A' roads in England - CGN0503a tab (2022)</li> <li>▪ Stirling: Average of 32 sites covering a range of speed limits, with fewer surveys on higher speed roads (2022)</li> <li>▪ Tower Hamlets: DfT average speed on urban 'A' roads in Tower Hamlets - CGN0503d tab (2022)</li> <li>▪ Tyneside: DfT average speed on urban 'A' roads in Tyne and Wear (Met Country) - CGN0503d tab (2022)</li> <li>▪ Republic of Ireland cities: 24-hr length-weighted (excluding motorways) vehicle speed estimated from TomTom link data (2019)</li> </ul> <ul style="list-style-type: none"> <li>• Congestion: DfT <a href="#">TAG</a> (2022)</li> <li>• Indirect taxation: DfT <a href="#">TAG</a> (2022)</li> <li>• Greenhouse gases: DfT <a href="#">TAG</a> (2022)</li> <li>• Local air quality: DfT <a href="#">TAG</a> (2022)</li> <li>• Soil and water quality: <a href="#">Gosling et al (2019)</a></li> <li>• Well-to-tank emissions: European Commission <a href="#">Handbook on the external costs of transport</a></li> <li>• Noise: DfT <a href="#">TAG</a> (2022)</li> <li>• Infrastructure maintenance: DfT <a href="#">TAG</a> (2022), European Commission <a href="#">Handbook on the external costs of transport</a> in Republic of Ireland.</li> </ul> <p><i>2021 data from equivalent 2021 data in 2021 prices. The same sources are used, with the exception of infrastructure maintenance (UK), which used the European Commission</i></p>

Data item	Sources and notes
	<p><a href="#"><u>Handbook on the external costs of transport</u></a>. Average mileage and road traffic statistics use 2019 data.</p> <p><i>Note: Alongside inflation, the increase in driving speeds observed during the Covid-19 pandemic mean that the UK 2021 values saw a reduced time cost of driving when compared to 2023, meaning, that compared to 2021 values, the 2023 figure shows walking as being much more favourable than driving. In addition, the latest average mileage figures are much lower than in 2021, resulting in higher vehicle operating costs per mile. In the Republic of Ireland models, the value of time in the source has decreased following a methodological change, resulting in a lower time cost for all modes. Additionally, in the Republic of Ireland, the method for calculating driving speeds has been adapted to reflect real speeds more accurately, resulting in higher (but more accurate) speeds than in 2021. The lower value of time means that walking is much more favourable than driving, despite the increased speeds. Inflation compounds this effect, as some walking values are positive (benefits), while all driving values are negative (costs).</i></p>
<p>Net annual economic benefit for individuals and society from people with a car choosing to walk or wheel for transport</p>	<p>This was calculated by multiplying:</p> <ul style="list-style-type: none"> <li>• the net economic benefit to individuals and society for each mile (or km) walked or wheeled instead of driven (above)</li> <li>• the estimated total distance walked or wheeled that could have been driven across the year.</li> </ul> <p><u>The distance walked or wheeled that could have been driven</u>  This was calculated by multiplying together:</p> <ul style="list-style-type: none"> <li>• the annual walking and wheeling trips by purpose: destination – adults only (see explanations for <a href="#"><u>page 10</u></a> of the Index report)</li> </ul>

Data item	Sources and notes
	<ul style="list-style-type: none"> <li>• the median trip distance for trips to a destination (from Q4b of the independent survey of residents)</li> <li>• the percentage of walkers and wheelers with access to a car (from Q1 of the independent survey of residents).</li> </ul> <p>The percentage of walkers and wheelers with access to a car was the percentage of respondents answering, '7 days a week', '5-6 days a week', '2-4 days a week' or 'once a week' to Q2c in the independent survey of residents who also answered that they had one or more cars or vans in their household in Q1 of the independent survey.</p> <p>Note that for Greater Manchester: the figure for annual walking and wheeling trips by purpose: destination included trips by children, while the distance/trips walked or wheeled that could have been driven included trips by adults only.</p> <p><i>2021 data from equivalent 2021 data for all available cities.</i></p>
<p>Net annual economic benefit for individuals and society from all walking and wheeling trips</p>	<p>The net annual economic benefit for individuals and society from all walking and wheeling trips is the benefits minus the costs.</p> <p>This is comprised of three parts:</p> <ul style="list-style-type: none"> <li>• the <b>net annual economic value for individuals and society from people with a car choosing to walk or wheel for transport</b> (see above), plus</li> <li>• the <b>value of similarly purposeful trips that are walked or wheeled by people without access to a car</b>, plus</li> <li>• the <b>value of leisure walking or wheeling trips</b> made by everyone.</li> </ul>

Data item	Sources and notes
	<p><u>The value of purposeful trips walked or wheeled by people without access to a car</u>  This was calculated by multiplying:</p> <ul style="list-style-type: none"> <li>• the <b>net economic benefit to individuals and society for each mile (or km) walked or wheeled</b></li> <li>• the estimated total <b>distance walked or wheeled that could not have been driven</b> across the year</li> </ul> <p><u>The net economic benefit to individuals and society for each mile (or km) walked or wheeled</u> is detailed in net economic benefit to individuals and society for each mile (or km) walked or wheeled instead of driven (above).</p> <p><u>The distance walked or wheeled that could not have been driven</u>  This was calculated by subtracting:</p> <ul style="list-style-type: none"> <li>• the <b>total miles (or km) walked and wheeled</b> in the city in the past year (see explanation of <a href="#">page 10</a> of the Index report)</li> <li>• the estimated <b>total distance of annual walking and wheeling trips by purpose: enjoyment or fitness – adults and children</b> (including running) (see also miles (or km) walked and wheeled in the city in the past year, both <a href="#">page 10</a> of the Index report).</li> <li>• the <b>distance walked or wheeled that could have been driven</b> (see net annual economic benefit for individuals and society from people with a car choosing to walk or wheel for transport, above)</li> </ul> <p><u>The value of leisure trips walked or wheeled</u>  This was calculated by multiplying:</p> <ul style="list-style-type: none"> <li>• the <b>net economic benefit to individuals and society for each mile (or km) walked or wheeled</b>, without the cost of time (see above)</li> </ul>

Data item	Sources and notes
	<ul style="list-style-type: none"> <li>the estimated <b>total distance of annual walking and wheeling trips by purpose: enjoyment or fitness – adults and children</b> (including running) (see also miles (or km) walked and wheeled in the city in the past year, both <a href="#">page 10</a> of the Index report).</li> </ul> <p><i>2021 values from equivalent 2021 data in 2021 prices. The same sources are used.</i></p>

## Walking and wheeling unlock health benefits for everyone (page 11)

Data item	Sources and notes
<p>Number of serious long-term health conditions prevented per year by walking (total, and by condition in the chart)</p>	<p>This was calculated using the Sport England MOVES tool (v2.4, 2023), which shows the return on investment for health from sport and physical activity. Credit to Sport England and the University of East Anglia (tool developers) who provided us with a pre-release copy of the new MOVES tool for use on the Index 2023.</p> <p>Physical activity protects against many illnesses. MOVES estimates the number of cases of eight specific conditions that are likely to be prevented:</p> <ul style="list-style-type: none"> <li>Type 2 Diabetes</li> <li>Ischaemic Heart Disease</li> <li>Cardiovascular Disease (Stroke)</li> <li>Dementia</li> <li>Depression</li> <li>Breast Cancer</li> <li>Colon Cancer</li> <li>Hip Fracture</li> </ul>

Data item	Sources and notes
	<p>As the MOVES tool is based on UK statistics of disease incidence, mortality rates and treatment costs, the tool was adapted to be used for the Republic of Ireland cities by including Irish life expectancy data (2015-17 Irish Life Tables from <a href="#">CSO</a>). This was the only Irish equivalent data available.</p> <p>Note that wheelchair and mobility scooter trips were modelled as walking trips for the purposes of the MOVES model.</p> <p><i>2021 data from equivalent 2021 data for all available cities using the 2016 version of the MOVES workbook.</i></p>
<p>Cost saving to the NHS in the city (HSE in Republic of Ireland cities)</p>	<p>This was also calculated using the MOVES tool (v2.4, 2023), and is the annual saving in health care costs arising from the number of serious long-term health conditions prevented per year by walking (above).</p> <p><i>2021 data from equivalent 2021 data for all available cities using the 2016 version of the MOVES workbook.</i></p>
<p>Number of GP appointments this cost equates to</p>	<p>The total cost saving to the NHS (HSE in the Republic of Ireland) in the city was divided by the average cost of a GP appointment.</p> <p>UK: £41 (<a href="#">Unit Costs of health and Social Care 2022 (amended 13 July 2023).pdf (kent.ac.uk)</a>)  Republic of Ireland: €55 (<a href="#">Revealed: How much we spend visiting the doctor each year   Independent.ie</a>)</p> <p><i>2021 data from equivalent 2021 data for all available cities.</i></p>



Data item	Sources and notes
Number of early deaths prevented annually	<p>This was calculated using the widely recognised World Health Organisation (WHO) Health Economic Assessment Tool (<a href="#">HEAT</a>, version 5.2.0). HEAT estimates the number of premature deaths prevented by specified amounts of walking.</p> <p>Note that wheelchair and mobility scooter trips were modelled as walking trips for the purposes of the HEAT model.</p> <p><i>2021 data from equivalent 2021 data for all available cities and HEAT version 5.0.6.</i></p>
Value of the early deaths prevented	<p>This was also calculated using the WHO HEAT tool, which subsequently estimates the value of the number of early deaths prevented annually. This is based on contingent valuation studies that test the amounts people would be prepared to pay to increase their chances of survival.</p> <p>The HEAT tool was not modified for an Irish context as it is based on Europe-wide context and is therefore applicable to the UK and the Republic of Ireland.</p> <p>Note that the value of early deaths prevented (from HEAT) is sometimes greater than the value shown at the bottom of page 10 of the Index report for the overall net benefit of walking and wheeling. The HEAT figure is a gross value including the value of early deaths prevented only, while the net benefit of walking and wheeling takes into account the wider range of benefits and costs associated with walking.</p> <p><i>2021 data from equivalent 2021 data for all available cities.</i></p>
Kg of NO <sub>x</sub> and particulates (PM <sub>10</sub> and PM <sub>2.5</sub> ) saved annually	<p>These were calculated from:</p> <ul style="list-style-type: none"> <li>the distance (see net annual economic benefit for individuals and society from</li> </ul>

Data item	Sources and notes
	<p>people with a car choosing to walk or wheel for transport, <a href="#">page 10</a> of the Index report) and</p> <ul style="list-style-type: none"> <li>the number of walking and wheeling trips that could have been driven annually, based on the emissions that an average car would produce.</li> </ul> <p>The calculation considers the average per trip emissions from a cold start, emissions per km at optimum catalytic convertor temperature, and emissions per km arising from brake wear and road abrasion, all taken from the <a href="#">National Atmospheric Emissions Inventory (NAEI)</a>. Diesel/petrol fleet split is factored into the calculations (NAEI in the UK, National Transport Authority/SYSTRA in the Republic of Ireland). Emissions from hybrid and electric cars were not included due to a lack of available data on these.</p> <p><i>2021 data from equivalent 2021 data for all available cities. Republic of Ireland fleet split from Environmental Protection Agency.</i></p>
Percentage of residents agreeing the air is clean in their local area	<p>The percentage of respondents answering 'strongly agree' or 'tend to agree' to Q16f in the independent survey of residents.</p> <p><i>2021 data from the corresponding 2021 survey question for all available cities.</i></p>

## Walking and wheeling in the city help mitigate our climate crisis (page 11)

Data item	Sources and notes
Tonnes of greenhouse gas emissions saved annually	<p>Greenhouse gas emissions saved were calculated by multiplying:</p> <ul style="list-style-type: none"> <li>The distance of walking or wheeling trips that could have been driven (see</li> </ul>

Data item	Sources and notes
	<p>explanations for the net annual economic benefit for individuals and society from people with a car choosing to walk or wheel for transport, <a href="#">page 10</a> of the Index report)</p> <ul style="list-style-type: none"> <li>The quantity of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O that would have been emitted by an average car per distance unit (expressed as CO<sub>2</sub> equivalent), as taken from the UK government <a href="#">greenhouse gas reporting conversion factors</a> (2022).</li> </ul> <p><i>2021 data from equivalent 2021 data for all available cities. Conversion factors from 2020.</i></p>
Equivalent number of flights to a worldwide destination	<p>This was calculated by dividing the total greenhouse gas emissions (above) by the average emissions from a single flight from the nearest airport to a destination city (based on the online flight emissions calculator <a href="#">carbonfootprint.com</a>).</p> <p><i>2021 data from equivalent 2021 data for all available cities.</i></p>
Contextual data on transport emissions over time	<p>English cities: Department for Business, Energy and Industrial Strategy (2021) UK greenhouse gas emissions, Final Figures [Online] Available at: <a href="#">2021 UK Greenhouse Gas Emissions, Final Figures (publishing.service.gov.uk)</a></p> <p>Scottish cities: Scottish Government (2021) Scottish greenhouse gas emissions 2021 [Online] Available at: <a href="#">Scottish Greenhouse Gas Statistics 2021 (www.gov.scot)</a></p> <p>Cardiff: StatsWales, Emissions of Greenhouse Gases by Year [Online] Available at: <a href="#">Emissions of Greenhouse Gases by Year (gov.wales)</a></p> <p>Belfast: Department of Agriculture, Environment and Rural Affairs (2021) Northern Ireland greenhouse gas inventory 1990-2019 [Online] Available at: <a href="#">Northern Ireland Greenhouse Gas Emissions 1990 – 2021 (daera-ni.gov.uk)</a></p>

Data item	Sources and notes
	Republic of Ireland: Environmental Protection Agency data (2021) Ireland's Final Greenhouse Gas Emissions, Final Figures [Online]. Available at: <a href="https://www.epa.ie/publications-and-reports/ghg/ghg_emissions/ireland-final-figures-2021">Ireland's Final Greenhouse Gas Emissions 1990-2021 (epa.ie)</a> Dublin Metropolitan Area: Codema, Dublin's Energy Agency (2021) Available at: Dublin Region Energy Masterplan, <a href="#">Codema, 2021 report</a>

## Walking and wheeling keep the city moving (page 11)

Data item	Sources and notes
Number of return walking and wheeling trips that are made daily by people who could have used a car	<p>This was calculated by:</p> <ul style="list-style-type: none"> <li>• multiplying the annual walking and wheeling trips by purpose: destination – adults only (see explanations for <a href="#">page 10</a> of the Index report)</li> <li>• by the proportion of walkers and wheelers with access to a car,</li> <li>• divided by 365 to get a value per day and</li> <li>• divided by 2 to get return trips.</li> </ul> <p>The proportion of walkers and wheelers with access to a car was the percentage of respondents answering '7 days a week', '5-6 days a week', '2-4 days a week' or 'once a week' to Q2c in the independent survey of residents who also answered that they had one or more cars or vans in their household in Q1 of the independent survey.</p> <p><i>2021 data from equivalent 2021 data and corresponding 2021 survey questions for all available cities.</i></p>
Length of the traffic jam that would	The number of return walking and wheeling trips that could have been made by car

Data item	Sources and notes
result from these cars	<p>(above) multiplied by the average length of a parking space (4.8m) to represent one car in a traffic jam for every trip.</p> <p>The place for the end of the traffic jam was identified by using the Google Maps journey planner.</p> <p><i>2021 data from equivalent 2021 data for all available cities.</i></p>

## Pages 12 and 13: Benefits of cycling

### Annual cycling trips by purpose (page 12)

Data item	Sources and notes
The number of times per day city residents cycle the distance around the world	Miles (km for the Republic of Ireland) cycled per day (below) divided by the equatorial circumference of the Earth (24,901 miles / 40,075 km).
*The number of times per day city residents cycle the equivalent length of Great Britain  Dunfermline, Dundee, Inverness, Perth, and Stirling only	Miles cycled per day (below) divided by the length of Great Britain using the <a href="#">Land's End to John O'Groats cycle route</a> (1,189 miles).
Number of cycle trips in the city in the past year	This is the sum of the total estimated number of trips cycled for all purposes. See below for how the number of trips by purpose is calculated.  <i>2021 data from equivalent 2021 data for all available cities.</i>
Miles (or km for the Republic of Ireland) cycled in the city in the past year, and per day	Respondents to the independent survey of residents were asked to give an estimate of the typical one-way distance of each trip purpose (work (Q6b), education (Q8b) or shopping/other purposeful/social trips (Q9b)) and the total round-trip distance for leisure trips (Q10b).  <u>Trips by children:</u> For school trips by children in the UK, an average cycling trip distance was taken from

Data item	Sources and notes
	<p>National Travel Survey (NTS) 2015-2019 and for child leisure trips an average cycling distance is taken from NTS 2020-21. For the Republic of Ireland child school and leisure distances are taken from National Transport Authority (NTA) transport modelling using National Household Travel Survey (NHTS) 2022 data.</p> <p>The median trip distance (mean for trips by children) for each trip purpose was multiplied by the total number of trips cycled for that purpose, and the distances travelled across trip purposes were summed. See below for how the number of trips for each purpose is calculated.</p> <p>Distance per year was divided by 365 to get miles (or km) per day.</p> <p>For Edinburgh, the average cycling trip distance from the 2016-2021 Scottish Household Survey data was used for all trip types.</p> <p><i>2021 data from equivalent 2021 data and corresponding 2021 survey questions. Child school and leisure trip distances from NTS 2015-19 and 2019, respectively, in the UK, and POWSCAR 2016 (school) and NTA/NHTS (leisure, date unspecified) in Republic of Ireland. Edinburgh: 2014-2019 Scottish Household Survey data.</i></p>
Annual trips by purpose: Work (adults)	<p>This was calculated by multiplying together:</p> <ul style="list-style-type: none"> <li>• the <b>number of cycle riders</b> in the adult population who cycle at least once a month,</li> <li>• the <b>proportion of respondents who cycle to or from work</b> from the residents survey <b>for each frequency</b> response,</li> <li>• the <b>number of days cycled per year for work</b></li> <li>• the <b>number of trips in a day</b> (two, to include return trips)</li> </ul>

Data item	Sources and notes
	<p>This was then summed and <b>seasonally adjusted</b> and multiplied by a <b>trip-chaining factor</b>.</p> <p><u>The number of cycle riders</u>  The number of cycle riders in the adult population was calculated by multiplying the city adult (16+) population by the percentage of respondents answering, '7 days a week', '5-6 days a week', '2-4 days a week', 'once a week', 'once a fortnight' or 'once a month' to Q2e in the independent survey of residents.</p> <p><u>The proportion of respondents who cycle to or from work</u>  For example, if 10% of respondents to Q6a in the independent survey of residents selected 'once a fortnight', then the proportion for the frequency category 'once a fortnight' would be 0.1 (or 10%).</p> <p><u>The number of days cycled per year for work</u>  The number of workdays per year were based on the number of <a href="#">working days</a> per year in 2023 for each nation minus 28 days of annual leave (20 in Republic of Ireland), minus the average number of days lost through sickness absence per worker per year for that nation/region (<a href="#">ONS</a>, 2022). For a seven-day work week, 52 compensation rest days per year and national public holidays were also subtracted. For the Republic of Ireland, the number of days lost through sickness are taken from the <a href="#">Common Appraisal Framework</a> (2021 update).</p> <p><u>The number of trips in a day</u>  This was assumed to be two (to work and back again).</p>



Data item	Sources and notes
	<p><u>Seasonality adjustment</u> The calculations included a correction for seasonal variation using Sustrans' database of average seasonal variation in cycling from a series of automatic counters over several years. We are able to correct with confidence for the relatively high levels of cycling likely to be exhibited during the survey period of March to June (April to July in Republic of Ireland). For the Republic of Ireland, counters from across all cities in Ireland are sourced from the NTA's database.</p> <p><u>Trip chaining factor</u> The seasonality-adjusted figure was divided by a trip-chaining factor (Primerano et al., 2008<sup>6</sup>) to account for double-counting of trips within different trip purposes.</p> <p>Note that for Greater Manchester, trip estimates were modelled from responses to the Transport for Greater Manchester Travel Diary Survey (TRADS) for the period of February 2022 to January 2023. This included the estimated number of walking trips done for the purposes of 'Commuting' by those aged 16 or older.</p> <p><i>2021 data from equivalent 2021 data and corresponding 2021 survey questions, using days per year from 2021 and sickness absence days from 2020 (2020 update in Republic of Ireland). Seasonal variation applied for the 2021 survey period of June to August (June to July in Republic of Ireland). Greater Manchester used TRADS data for the period of October 2020 to September 2021 for those aged 17 and older.</i></p>

---

<sup>6</sup> Primerano, F et al. (2008) Defining and understanding trip chaining behaviour, *Transportation* 35, 55–72 [Online].

Data item	Sources and notes
Annual trips by purpose: School, college, or university (adults)	<p>The calculation for this is the same as for <a href="#">Annual trips by purpose: Work (adults)</a> (see explanations above) but using the number of school days in a year in place of the number of workdays.</p> <p>The annual trips to school, college, or university by adults (including accompanying a child to school) were estimated from the responses to Q8a in the independent survey of residents and scaled up for the adult (16+) population of cycle riders (once a month or more).</p> <p>The number of school days in a year was based on the number of days for that country's school year, minus the school absence rate for the city's region then multiplied by the number of days in the school year (sources as walking, see explanations for <a href="#">page 10</a> of the Index report).</p> <p>The calculations included a correction for seasonal variation and trip chaining (as above: annual trips by purpose: Work (adults)).</p> <p>Note that for Greater Manchester, trip estimates were modelled from responses to the Transport for Greater Manchester Travel Diary Survey (TRADS) for the period of February 2022 to January 2023. This included the estimated number of walking trips done for the purposes of 'Education' and 'Escort education' by those aged 16 or older.</p> <p><i>2021 data from equivalent 2021 data and corresponding 2021 survey questions, using days per year from 2021 and sickness absence days from 2020 (2020 update in Republic of Ireland). Greater Manchester used TRADS data for the period of October 2020 to September 2021 for those aged 17 and older.</i></p>

Data item	Sources and notes
Annual trips by purpose: School – children only	<p>Annual trips to school by children cycling was calculated in the same way and using the same sources as annual walking and wheeling trips by purpose: school – children only (see explanations for <a href="#">page 10</a> of the Index report), but using the proportion of children in the city who cycle to school.</p> <p>See <a href="#">2021 methodology report</a> for 2021 data sources. Greater Manchester used TRADS data for the period of October 2020 to September 2021 for those aged 16 and under.</p>
Annual trips by purpose: Shopping, personal business, and social trips (adult <sup>7</sup> )	<p>The calculation for this was the same as for annual trips by purpose: Work (adults) (see explanations for <a href="#">page 12</a> of the Index report) but using the total number of days that could be cycled for this purpose in a year in place of the number of workdays.</p> <p>The number of shopping, personal business and social trips was estimated from the responses to Q9a in the independent survey of residents and scaled up for the adult population (16+) of cycle riders (once a month or more to Q2e in the independent survey of residents).</p> <p>The number of days that could be cycled for this purpose in a year was based on the total number of days in a year (365) minus the number of days lost through sickness absence per worker per year (<a href="#">ONS, 2022</a>) for that nation/region. For the Republic of Ireland, the number of days lost through sickness are taken from the <a href="#">Common Appraisal Framework</a> (2021 update).</p>

<sup>7</sup> Shopping, personal business and social trips for Greater Manchester also includes trips by children, due to using TRADS data as an input for modelling.

Data item	Sources and notes
	<p>The calculations included a correction for seasonal variation and trip chaining (as above: <a href="#">Annual trips by purpose: Work (adults)</a>).</p> <p>Note that for Greater Manchester, trip estimates were modelled from responses to the Transport for Greater Manchester Travel Diary Survey (TRADS) for the period of February 2022 to January 2023. This included the estimated number of cycling trips done for the purposes of ‘Escort other’, ‘Personal business’, ‘Shopping’, ‘Sport and entertainment’ and ‘Visiting friends’ by all ages.</p> <p><i>2021 data from equivalent 2021 data and corresponding 2021 survey questions, using days per year from 2021 and sickness absence days from 2020 (2020 update in Republic of Ireland). Greater Manchester used TRADS data for the period of October 2020 to September 2021.</i></p>
Annual trips by purpose: Leisure (adults and children)	<p>This is the sum of the total estimated number of leisure trips cycled by adults and children.</p> <p><b>For adult leisure trips:</b> The number of trips by adults is estimated from the responses to Q10a in the independent survey of residents and scaled up for the adult population (16+) of cycle riders (once a month or more to Q2e in the independent survey of residents). This is calculated in the same way as annual trips by purpose: Shopping, personal business and social trips (adult), including the same number of days sources.</p> <p>The calculations include a correction for seasonal variation and trip chaining (as above: <a href="#">Annual trips by purpose: Work (adults)</a>).</p>

Data item	Sources and notes
	<p><b>Child trips for enjoyment or fitness were estimated using the following method:</b></p> <ul style="list-style-type: none"> <li>• Calculating the adult leisure trips (as <b>Error! Reference source not found.</b>) for the subset of <b>adult cyclists who have at least one child in their household.</b></li> <li>• Dividing this by the <b>number of adults with children in their household</b> to get trips per adult per year</li> <li>• Then multiplying the result by the <b>ratio of leisure walking trips per person per year</b> (adults from households with children: children) and</li> <li>• Multiplied by the child population</li> </ul> <p><u>The number of adult cyclists with children in their household:</u> This is calculated by multiplying the proportion of respondents to the residents survey who cycle at least once a month (Q10a) that have at least one child in their household (Q30) by the <b>number of cyclists</b> in the population (using the same method as <a href="#">Annual trips by purpose: Shopping, personal business and social trips</a> (above), including seasonal adjustment and trip-chaining adjustment).</p> <p><u>The number of adults with children in their household:</u> This is calculated by multiplying the proportion of respondents to the residents survey who have at least one child in their household (calculated from Q30 and the adult population) by the adult population.</p> <p><u>Ratio of leisure cycling trips per person per year</u> (adults from households with children: children): We calculated the ratio of child leisure trips (15 and under) per child per year to adult leisure trips (aged 16+) by those in households with children per adult per year, by using a custom data table from the National Travel Survey 2021. Leisure trips include the purposes</p>

Data item	Sources and notes
	<p>'day trip' only. For the Republic of Ireland, the ratio is calculated from 2022 National Household Travel Survey data (NHTS) ('round trip' only).</p> <p>Note that for Greater Manchester, trip estimates were modelled from responses to the Transport for Greater Manchester Travel Diary Survey (TRADS) for the period of February 2022 to January 2023. This is included the estimated number of cycling trips done for the purpose of 'Holidays and round trips' by all ages.</p> <p><i>2021 data from corresponding 2021 survey question, using a ratio calculated from NTS 2015-2019 rolling average data (NHTS 2017 data in the Republic of Ireland). Greater Manchester used TRADS data for the period of October 2020 to September 2021.</i></p>

## Cycling benefits residents and the local economy (page 12)

Data item	Sources and notes
<p>Net economic benefit to individuals and society for each mile (or km for the Republic of Ireland) cycled instead of driven</p>	<p>This is the difference between the net economic value to individuals and society for each mile (or km) cycled and the net economic value to individuals and society for each mile (or km) driven.</p> <p>The net economic value to individuals and society for each mile (or km) cycled included figures for (from largest to smallest effect): the value of time spent cycling (costed as the midpoint between commuting and other non-work values), a health value (reduction in medical costs and work absenteeism), the value of additional life years and operating costs of cycling (ie cycle maintenance), per mile.</p>

Data item	Sources and notes
	<p><b>Sources used</b> (adjusted to 2023 prices and, where the value year is provided in the source, 2023 values):</p> <ul style="list-style-type: none"> <li>• Value of time spent cycling: value of time divided by cycling speed <ul style="list-style-type: none"> <li>○ Value of time: DfT <a href="#">TAG</a> (2022), <a href="#">Transport Appraisal Framework</a> in the Republic of Ireland</li> <li>○ Cycling speed: <a href="#">HEAT</a></li> </ul> </li> <li>• Health: <a href="#">Gossling et al (2019)</a></li> <li>• Prolonged life: <a href="#">Gossling et al (2019)</a></li> <li>• Vehicle operating costs: <a href="#">Gossling et al (2019)</a></li> </ul> <p>The net economic value to individuals and society for each mile (or km) driven is detailed under net economic benefit to individuals and society for each mile (or km for the Republic of Ireland) walked or wheeled instead of driven (<a href="#">page 10</a> of the Index report).</p> <p><i>2021 data from equivalent 2021 data in 2021 prices. The same sources are used, with the exception of infrastructure maintenance, which used the European Commission <a href="#">Handbook on the external costs of transport</a> (2016) in both the UK and Republic of Ireland. Average mileage and road traffic statistics use 2019 data.</i></p> <p><i>Note: Alongside inflation, the increase in driving speeds observed during the Covid-19 pandemic mean that the UK 2021 values saw a reduced time cost from driving when compared to 2023, meaning that, compared to 2021 values, the 2023 figure shows cycling as being much more favourable than driving. In addition to this, the latest average mileage figures are much lower than in 2021, resulting in higher per mile vehicle operating costs. In the Republic of Ireland models, the value of time in the source has decreased following a methodological change, resulting in a lower time cost for all modes. Additionally, in the</i></p>

Data item	Sources and notes
	<p><i>Republic of Ireland, the method for calculating driving speeds has been adapted to reflect real speeds more accurately, resulting in higher (but more accurate) speeds than in 2021. The lower value of time means that cycling is much more favourable than driving, despite the increased speeds. Inflation compounds this effect, as some cycling values are positive (benefits), while all driving values are negative (costs).</i></p>
<p>Net annual economic benefit for individuals and society from people with a car choosing to cycle for transport</p>	<p>This was calculated by multiplying:</p> <ul style="list-style-type: none"> <li>• the net economic benefit to individuals and society for each mile (or km for the Republic of Ireland) cycled instead of driven (above)</li> <li>• the estimated total distance cycled that could have been driven across the year.</li> </ul> <p><u>The distance cycled that could have been driven</u>  This was calculated by:</p> <ul style="list-style-type: none"> <li>• summing the annual miles (or km) cycled for the purposes of work, school, college, or university (adult) or shopping, personal business and social trips (see explanations for <a href="#">page 12</a> of the Index report) and</li> <li>• multiplying this by the proportion of cycle riders with access to a car (from Q1 of the independent survey of residents).</li> </ul> <p>The proportion of cycle riders with access to a car was the percentage of respondents answering '7 days a week', '5-6 days a week', '2-4 days a week' or 'once a week' to Q2e in the independent survey of residents who also answered that they had one or more cars or vans in their household in Q1 of the independent survey.</p> <p><i>2021 data from equivalent 2021 data and corresponding 2021 survey questions for all available cities.</i></p>



Data item	Sources and notes
<p>Net annual economic benefit for individuals and society from all cycling trips</p>	<p>The net annual economic benefit for individuals and society from all cycling trips is the benefits minus the costs.</p> <p>This is comprised of three parts:</p> <ul style="list-style-type: none"> <li>• the <b>net annual economic benefit for individuals and society from people with a car choosing to cycle for transport</b> (above), plus</li> <li>• the <b>value of similarly purposeful trips but cycled by people without access to a car</b>, plus</li> <li>• the <b>value of leisure cycle trips</b> made by everyone.</li> </ul> <p><u>The value of purposeful trips cycled by people without access to a car</u>  This was calculated by multiplying:</p> <ul style="list-style-type: none"> <li>• the <b>net economic benefit to individuals and society for each mile (or km) cycled</b></li> <li>• the estimated <b>total distance cycled that could not have been driven</b> across the year.</li> </ul> <p><u>The net economic benefit to individuals and society for each mile (or km) cycled</u> is detailed in net economic benefit to individuals and society for each mile (or km) cycled instead of driven (above).</p> <p><u>The distance cycled that could not have been driven</u>  This was calculated by subtracting:</p> <ul style="list-style-type: none"> <li>• the total miles (or km) cycled in the city in the past year (see <a href="#">page 12</a> of the Index report)</li> <li>• the estimated total distance cycled for leisure.</li> </ul>

Data item	Sources and notes
	<ul style="list-style-type: none"> <li>the distance cycled that could have been driven (see net annual economic benefit for individuals and society from people with a car choosing to cycle for transport, above).</li> </ul> <p><u>The value of leisure trips cycled</u> This was calculated by multiplying:</p> <ul style="list-style-type: none"> <li>the net economic benefit to individuals and society for each mile (or km) cycled, without the cost of time.</li> <li>the estimated <b>total distance of annual trips by purpose: Leisure</b> (adults and children) (see also miles (or km) cycled in the city in the past year, both <a href="#">page 12</a> of the report).</li> </ul> <p><i>2021 values from equivalent 2021 data in 2021 prices.</i></p>

## Cycling unlocks health benefits for everyone (page 13)

Data item	Sources and notes
Number of serious long-term health conditions prevented per year by cycling (total, and by condition in the chart)	<p>This was calculated using the Sport England MOVES tool (v2.4, 2023), which shows the return on investment for health from sport and physical activity. Credit to Sport England and the University of East Anglia (tool developers) who provided us with a pre-release copy of the new MOVES tool for use on the Index 2023.</p> <p>Physical activity protects against many illnesses. MOVES estimates the number of cases of eight specific conditions that are likely to be prevented:</p> <ul style="list-style-type: none"> <li>Type 2 Diabetes</li> </ul>

Data item	Sources and notes
	<ul style="list-style-type: none"> <li>• Ischaemic Heart Disease</li> <li>• Cardiovascular Disease (Stroke)</li> <li>• Dementia</li> <li>• Depression</li> <li>• Breast Cancer</li> <li>• Colon Cancer</li> <li>• Hip Fracture</li> </ul> <p>The MOVES tool is based on UK statistics of disease incidence, mortality rates and treatment costs, and the tool was adapted to be used for the Republic of Ireland by including Irish life expectancy data (2015-17 Irish Life Tables from <a href="#">CSO</a>). This was the only Irish equivalent data available.</p> <p><i>2021 data for total cases avoided from corresponding 2021 values for all available cities using the 2016 version of the MOVES workbook.</i></p>
Cost saving to the NHS in the city (HSE in Republic of Ireland)	<p>This was also calculated using the MOVES tool and is the annual saving in health care costs arising from the number of serious long-term health conditions prevented per year by cycling (above).</p> <p><i>2021 data from corresponding 2021 values for all available cities using the 2016 version of the MOVES workbook.</i></p>
Number of GP appointments this cost equates to	<p>The total cost saving to the NHS (HSE in the Republic of Ireland) in the city was divided by the average cost of a GP appointment.</p> <p>UK: £41 (<a href="#">Unit Costs of health and Social Care 2022 (amended 13 July 2023).pdf</a>)</p>

Data item	Sources and notes
	<p><a href="http://kent.ac.uk">kent.ac.uk</a>            Republic of Ireland cities: €55 (<a href="#">Revealed: How much we spend visiting the doctor each year   Independent.ie</a>)</p> <p><i>2021 data from corresponding 2021 values for all available cities.</i></p>
Number of early deaths prevented annually	<p>This was calculated using the widely recognised World Health Organisation (WHO) Health Economic Assessment Tool (<a href="#">HEAT</a> version 5.2.0). This estimates the number of premature deaths prevented by specified amounts of cycling.</p> <p><i>2021 data from corresponding 2021 values for all available cities and HEAT version 5.0.6.</i></p>
Value of the early deaths prevented	<p>This was also calculated using the WHO HEAT tool, which subsequently estimates the value of the number of early deaths prevented annually. This is based on contingent valuation studies that test the amounts people would be prepared to pay to increase their chances of survival.</p> <p>The HEAT tool was not modified for an Irish context as it is based on Europe-wide context and is therefore applicable to the UK and the Republic of Ireland.</p> <p>Note that the value of early deaths prevented (from HEAT) is sometimes greater than the value shown at the bottom of page 12 of the report for the overall net benefit of cycling. The HEAT figure is a gross value including the value of early deaths prevented only, while the value for overall net benefit of cycling takes into account the wider range of benefits and costs associated with cycling.</p> <p><i>2021 data from equivalent 2021 values for all available cities.</i></p>

Data item	Sources and notes
Kg of NO <sub>x</sub> and particulates (PM <sub>10</sub> and PM <sub>2.5</sub> ) saved annually	<p>These were calculated from:</p> <ul style="list-style-type: none"> <li>the distance (see explanations for net annual economic benefit for individuals and society from people with a car choosing to cycle for transport, <a href="#">page 12</a> of the Index report) and</li> <li>the number of cycling trips that could have been driven annually, based on the emissions that an average car would produce.</li> </ul> <p>The calculation considers the average per trip emissions from a cold start, emissions per km at optimum catalytic convertor temperature, and emissions per km arising from brake wear and road abrasion, all taken from the <a href="#">National Atmospheric Emissions Inventory (NAEI)</a>. Diesel/petrol fleet split is factored into the calculations (NAEI in the UK, National Transport Authority/SYSTRA in the Republic of Ireland). Emissions from hybrid and electric cars were not included due to a lack of available data on these.</p> <p><i>2021 data from equivalent 2021 values for all available cities. Republic of Ireland fleet split from Environmental Protection Agency (EPA).</i></p>
Percentage of residents agreeing the air is clean in their local area	<p>The percentage of respondents answering ‘strongly agree’ or ‘tend to agree’ to Q16f in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey question (Q16f) for all available cities.</i></p>

## Cycling in the city helps mitigate our climate crisis (page 13)

Data item	Sources and notes
Tonnes of greenhouse gas emissions saved annually	<p>Greenhouse gas emissions saved were calculated by multiplying:</p> <ul style="list-style-type: none"> <li>• The distance of cycle trips that could have been driven (see explanations for the net annual economic benefit for individuals and society from people with a car choosing to cycle for transport, <a href="#">page 12</a> of the Index report)</li> <li>• The quantity of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O that would have been emitted by an average car per distance unit (expressed as CO<sub>2</sub> equivalent), as taken from the UK government <a href="#">greenhouse gas reporting conversion factors</a> (2022).</li> </ul> <p><i>2021 data from equivalent 2021 data for all available cities. Conversion factors from 2020.</i></p>
Equivalent number of flights to a worldwide destination	<p>This was calculated by dividing the total CO<sub>2</sub> equivalent emissions (above) by the average emissions from a single flight from the nearest airport to a destination city (based on the online flight emissions calculator <a href="#">carbonfootprint.com</a>).</p> <p><i>2021 data from equivalent 2021 data for all available cities.</i></p>
Contextual data on transport emissions over time	Repeated figures from <a href="#">page 11</a> of the Index report: Contextual data on transport emissions over time.

## Cycling keeps the city moving (page 13)

Data item	Sources and notes
Number of return cycle trips that are made daily by people that could have	<p>This is calculated by:</p> <ul style="list-style-type: none"> <li>• multiplying the annual trips cycled for the purposes of work, school, college or</li> </ul>

Data item	Sources and notes
used a car	<p>university (adult) or shopping, personal business and social trips (see explanations for <a href="#">page 12</a> of the Index report)</p> <ul style="list-style-type: none"> <li>• by the proportion of cycle riders with access to a car,</li> <li>• divided by 365 to get a value per day and</li> <li>• divided by 2 to get return trips.</li> </ul> <p>The proportion of cycle riders with access to a car was the percentage of respondents answering '7 days a week', '5-6 days a week', '2-4 days a week' or 'once a week' to Q2e in the independent survey of residents who also answered that they had one or more cars or vans in their household in Q1 of the independent survey.</p> <p><i>2021 data from equivalent 2021 data and corresponding 2021 survey questions for all available cities.</i></p>
Length of the traffic jam that would result from these cars	<p>The number of return cycle trips that could have been made by car (above) multiplied by the average length of a parking space (4.8m) to represent one car in a traffic jam for every trip.</p> <p>The place for the end of the traffic jam was identified by using the Google Maps journey planner.</p> <p><i>2021 data from corresponding 2021 values for all available cities.</i></p>

## Pages 14 and 15: Walking solutions

### Residents want more services and amenities within walking and wheeling distance (page 14)

Data item	Sources and notes
<p>Percentage of households located in neighbourhoods of walkable density (40 homes per hectare)</p>	<p>City boundaries were divided into grid (hectares) and households/ dwellings were calculated per grid square by intersection. Household density was calculated by dividing the number of households by grid square area (<math>\leq 1</math> hectare). The proportion of hectares with 40 or more households against total hectarage was calculated.</p> <p>Household data sources and licence numbers:</p> <p>UK household data (except Belfast) was supplied by Digital Mapping Solutions from Dotted Eyes as MarkerUp postcode unit point dataset with number of households per postcode. © Crown Copyright 2023. All rights reserved. Licence numbers 100019918, 100046668 (Scottish cities), AC0000819638 (Birmingham), 100023406 (Bristol), 100031673 (Cardiff), 100023205 (Greater Cambridge), 0100022610 (Greater Manchester), 100019918 (Liverpool City Region), 100019679 (Southampton City Region), 100019288 (Tower Hamlets), 100019569 (Tyneside). Also Contains National Statistics data © Crown copyright and database right 2023.</p> <p>Belfast households from Royal Mail Postcode Address File (PAF) database and the AddressList mail generation program by Arc en Ciel Ltd.</p>



Data item	Sources and notes
	Republic of Ireland household data is licenced under the National Mapping Agreement: CYAL50370872 © Tailte Éireann – Surveying.
<p>Percentage of residents who would find more local amenities and services useful to help them walk or wheel more:</p> <ul style="list-style-type: none"> <li>• More shops and everyday services, such as banks and post offices, close to your home</li> <li>• More government services, such as doctors surgeries and schools, close to your home</li> <li>• More parks or green spaces close to your home</li> <li>• More things to see and do close to your home, like cafes or entertainment venues</li> </ul>	<p>The percentage of respondents answering ‘very useful’ or ‘fairly useful’ to Q11a, Q11b, Q11l, Q11k in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey question for all available cities.</i></p>
<p>Percentage of residents who agree they can get to many places they need to visit without having to drive</p>	<p>The percentage of respondents answering ‘strongly agree’ or ‘tend to agree’ to Q16c in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey question for all available cities.</i></p>
<p>Percentage of households located within an 400m walk or wheel of the following amenities and services</p>	<p>400m (or 800m for Train station or Metro/ Tram stop in the UK, and 800m for all amenities (except bus stops) in the Republic of Ireland and Belfast).</p>

Data item	Sources and notes
<p>(800m for the Republic of Ireland and Belfast):</p> <ul style="list-style-type: none"> <li>• <b>Food shop</b></li> <li>• <b>Park or space for recreation</b></li> <li>• <b>Doctors surgery</b></li> <li>• <b>Primary school</b></li> <li>• <b>Library</b></li> <li>• <b>Post office</b></li> <li>• <b>A mix of cultural and leisure venues</b></li> <li>• <b>Train station or Metro/ Tram stop (within 800m)</b></li> <li>• <b>Bus stop</b></li> </ul>	<p>Concentric rings were drawn for each facility within the city boundary. Households within these rings were then identified and percentages were calculated.</p> <p>For household data sources and licences, see explanation for Percentage of households located in neighbourhoods of walkable density (40 homes per hectare), <a href="#">page 13</a> of the Index report.</p> <p><u>Amenities and services</u></p> <p><b>Food shop:</b> Open Street Map (OSM) Overpass query where key = shop and value = <a href="#">convenience</a>, <a href="#">newsagent</a>, <a href="#">supermarket</a> and <a href="#">kiosk</a>. © OpenStreetMap contributors. Data not reported for Dundee, because it is suspected that there is significant under-reporting of shops in OSM by both the local authority and by Sustrans.</p> <p><b>Park or space for recreation:</b>  England, Wales and Scotland: <a href="#">Ordnance Survey Open Greenspace</a> access points</p> <p>Republic of Ireland and Belfast: OSM Overpass query where key = landuse and value = <a href="#">allotments</a>, <a href="#">cemetery</a>, <a href="#">recreation_ground</a> or where key = leisure and value = <a href="#">park</a> © OpenStreetMap contributors.  No minimum area was defined, therefore very small public greenspaces were included.</p> <p><b>Doctors surgery:</b>  England and Wales: Healthcare data sourced from <a href="#">NHS Digital</a> under Open Government Licence (OGL). NHS GP Practices “epracur” dataset</p> <p>Scotland: Healthcare data sourced from © copyright Public Health Scotland under Open</p>

Data item	Sources and notes
	<p>Government. List of general practices (GP surgeries) in Scotland with practice addresses dataset (<a href="#">Scotland Practice List</a>)</p> <p>Belfast: Healthcare data sourced from Business Services Organisation under Open Government Licence (OGL). <a href="#">Northern Ireland Practice List</a> (MS Excel)</p> <p>Republic of Ireland OSM Overpass query where key = amenity and value = <a href="#">doctors</a>. © OpenStreetMap contributors.</p> <p><b>Primary school:</b>  England and Wales: schools data is sourced from <a href="#">data.gov.uk</a> under Open Government Licence v.3.0 dataset</p> <p>Scotland: Scottish schools data is sourced from <a href="#">data.gov.uk</a> under Open Government Licence v.3.0 dataset</p> <p>Belfast: schools data is sourced from data.gov.uk under Open Government Licence v.3.0 dataset (<a href="#">apps.education-ni.gov.uk</a>)</p> <p>Republic of Ireland: schools' data is sourced from <a href="#">data.gov.ie</a> under Creative Commons Attribution 4 International (CC BY 4.0)</p> <p><b>Libraries:</b>  OSM Overpass query where key = amenity and value = <a href="#">library</a>. © OpenStreetMap contributors.  Data not reported for Aberdeen, Cardiff, Cork Metropolitan Area, Dublin Metropolitan Area,</p>

Data item	Sources and notes
	<p>Dundee, Greater Cambridge, Greater Manchester, Liverpool City Region, Southampton City Region, Stirling and Tyneside, where significant under-reporting of libraries is suspected on Open Street Map (&lt;75%).</p> <p><b>Post office:</b>            UK cities: Post Office Ltd. Contains public sector information licensed under the Open Government Licence v3.0. <a href="#">UK Post Office Branch List 2022</a></p> <p>Republic of Ireland: OSM Overpass query where key = amenity and value = <a href="#">post office</a>. © OpenStreetMap contributors.</p> <p><b>Bus stop:</b>            England, Scotland, and Wales: Bus Stop data is sourced from <a href="#">National Public Transport Access Nodes (NaPTAN)</a> under Open Government Licence v.3.0. National dataset.</p> <p>Belfast: OpenDataNI <a href="#">Translink Bus Stop List</a> under Open Government Licence v.3.0</p> <p>Republic of Ireland: <a href="#">NaPTAN published by National Transport Authority</a> open data.</p> <p><b>Railway station and metro/ tram stops (where relevant):</b>            England, Scotland and Wales: Train/ metro/ tram station data is sourced from <a href="#">National Public Transport Access Nodes (NaPTAN)</a> under Open Government Licence v.3.0.</p> <p>Republic of Ireland and Belfast: OSM Overpass query where key = station and value = <a href="#">halt, station</a>. © OpenStreetMap contributors.</p>

Data item	Sources and notes
	<p><b>Cultural and leisure venues:</b>  OSM Overpass query where key = amenity and value = <a href="#">arts centre</a>, <a href="#">bar</a>, <a href="#">café</a>, <a href="#">cinema</a>, <a href="#">fast food</a>, <a href="#">food court</a>, <a href="#">nightclub</a>, <a href="#">pub</a>, <a href="#">restaurant</a>, <a href="#">theatre</a> or where key = shop and value = <a href="#">department store</a>, <a href="#">mall</a> or where key = leisure and value = <a href="#">ice rink</a>, <a href="#">sports centre</a>, <a href="#">stadium</a>, <a href="#">swimming pool</a> or where key = tourism and value = <a href="#">museum</a>, <a href="#">theme park</a>, <a href="#">zoo</a> © OpenStreetMap contributors.</p> <p><i>For 2023 we revised the distances to amenities to look at 400m concentric circles therefore there is no comparison data to 2021 available.</i></p>

## Residents want better streets (page 15)

Data item	Sources and notes
<p>Percentage of residents who would find the following changes helpful to walk or wheel more:</p> <ul style="list-style-type: none"> <li>• Wider pavements (footpaths for the Republic of Ireland cities)</li> <li>• More frequent road crossings, with reduced wait times</li> <li>• Nicer places along streets to stop and rest, like more benches, trees and shelters</li> <li>• Better pavement (footpath for</li> </ul>	<p>The percentage of respondents answering ‘very useful’ or ‘fairly useful’ to Q11h, Q11i, Q11j, Q11g, Q11f, Q11c in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey question.</i></p>

Data item	Sources and notes
<p>the Republic of Ireland cities) accessibility, like level surfaces, dropped kerbs at crossing points</p> <ul style="list-style-type: none"> <li>• Fewer cars parked on the pavement (footpath for the Republic of Ireland)</li> <li>• Less fear of crime or antisocial behaviour in your area</li> </ul>	
<p>Percentage of:</p> <ul style="list-style-type: none"> <li>• A and B roads (National and Regional for the Republic of Ireland) with pavement (footpath for the Republic of Ireland) widths greater than 3m</li> <li>• C and unclassified roads (minor for the Republic of Ireland) with pavement (footpath for the Republic of Ireland) widths greater than 2m</li> </ul>	<p>Pavement widths are calculated from frontage to kerb. These have been calculated without any obstructions, but we acknowledge ‘obstructions’ will occur in varying degrees of permanence and legitimacy, from street furniture like bus shelters, benches, trees, litter bins and lamp posts, to other obstacles like parked cars, roadworks, wheelie bins or fallen leaves.</p> <p>2m and 3m pavement widths were generated as polygons using a <a href="#">2020 adapted, ESRI UK methodology</a>. Road network for each city split into 10m segments, buffered, and filtered where they intersect pavement width polygons. Total length of road segments aggregated where classification is A, B and C (unclassified) and compared with total road network length.</p> <p>UK road network: <a href="#">Ordnance Survey Open Roads data</a> © Crown copyright and database right 2021. A and B Roads (A Road and B Road classifications) and C and Unclassified Roads (Unclassified, Classified Unnumbered and Unknown classifications).</p>

Data item	Sources and notes
	<p>Republic of Ireland: OSM Overpass query where key = highway and value = <a href="#">primary</a>, <a href="#">primary_link</a>, <a href="#">secondary</a>, <a href="#">secondary_link</a>, <a href="#">trunk</a>, <a href="#">trunk_link</a> (to represent National and Regional roads) and where key = highway and value = <a href="#">residential</a>, <a href="#">tertiary</a>, <a href="#">tertiary_link</a>, <a href="#">unclassified</a> (to represent minor roads). © OpenStreetMap contributors.</p> <p>England and Wales: Pavement widths are calculated using OS Mastermap Topographic data © crown copyright and database rights 2023 Licence number 100019918, 100046668 (Scottish cities), AC0000819638 (Birmingham), 100023406 (Bristol), 100031673 (Cardiff), 100023205 (Greater Cambridge), 0100022610 (Greater Manchester), 100019918 (Liverpool City Region), 100019679 (Southampton City Region), 100019288 (Tower Hamlets), 100019569 (Tyneside).</p> <p>Scotland: Pavement widths calculated using OS Mastermap Topographic data © crown copyright and database rights 2023 OS 100046668. This product contains data created and maintained by Scottish Local Government.</p> <p>Republic of Ireland: Footpath widths were calculated using Tailte Éireann’s (formerly OSi) Prime II data licenced under the National Mapping Agreement: CYAL50370872 © Tailte Éireann – Surveying.</p> <p>Belfast: Pavement widths were not calculated, as data sources were not available.</p>
<p>Percentage of all roads making up junctions that do not have a red or green man for pedestrians</p>	<p>For all roads that make up junctions within the city boundary, where the flow of vehicles is controlled by traffic signals. Each junction arm in the city is counted as either having a pedestrian phase or not. Excludes motorway junctions and ‘mid-block’ signals which only exist to manage the interaction between vehicles and footway traffic.</p>

Data item	Sources and notes
	<p>Data supplied by partner authorities.</p> <p>The following cities supplied data: Aberdeen, Belfast, Dublin Metropolitan Area, Dundee, Dunfermline, Edinburgh, Glasgow, Greater Cambridge, Inverness, Liverpool City Region, Perth, Southampton City Region, Stirling and Tower Hamlets.</p> <p>The following cities did not supply data: Birmingham, Bristol, Cardiff, Cork Metropolitan Area, Galway Metropolitan Area, Limerick Shannon Metropolitan Area, Tyneside and Waterford Metropolitan Area.</p> <p>Edinburgh City Council prefer to count arms with a 2-stage crossing as 2 rather than 1. When comparing with other cities, it should be noted that this may make a small difference to the percentage of junction arms without a pedestrian phase.</p> <p>Greater Manchester could not provide data on a junction arm level, so data presented is for signalised junctions. This data is not comparable with any other Index city.</p> <p><i>2021 data for those who supplied data for the Index 2021.</i></p>
<p>Percentage of residents who agree that more measures to reduce crime and antisocial behaviour on the street or in public spaces would improve their local area</p>	<p>The percentage of respondents answering 'strongly agree' or 'tend to agree' to Q17e in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey question for all available cities.</i></p>
<p>Story from a city resident</p>	<p>Case studies from local city residents were sourced from local contacts.</p>



## Pages 16 and 17: Cycling solutions

### Many city residents want to cycle (page 16)

Data item	Sources and notes
Percentage of residents who see themselves as someone who: <ul style="list-style-type: none"> <li>• Regularly cycles,</li> <li>• Occasionally cycles,</li> <li>• Are new or returning to cycling,</li> <li>• Do not cycle but would like to,</li> <li>• Do not cycle and do not want to</li> </ul>	The percentage of respondents giving these answers to Q13 in the independent survey of residents.  <i>2021 data from corresponding 2021 survey question for all available cities.</i>
Proportion of residents who said they 'do not cycle but would like to' for: <ul style="list-style-type: none"> <li>• Women</li> <li>• Ethnic minority groups</li> <li>• Disabled people</li> </ul>	The percentage of respondents of these specific gender, ethnicity and disability demographic groups (Q25a, Q28, Q34) answering 'do not cycle but would like to', to Q13 in the independent survey of residents.  <i>2021 data from corresponding 2021 survey questions for all available cities.</i>

### Residents want improved cycling infrastructure (page 16)

Data item	Sources and notes
Percentage of residents who would be helped to cycle more by better	The percentage of respondents answering 'very useful' or 'fairly useful' to Q12b, Q12a, Q12c, Q12m in the independent survey of residents.

Data item	Sources and notes
<p>facilities:</p> <ul style="list-style-type: none"> <li>• More traffic-free cycle paths away from roads, like through parks or along waterways</li> <li>• More cycle paths along roads which are physically separated from traffic and pedestrians</li> <li>• More signposted local cycle routes along quieter streets</li> <li>• Better links with public transport, like secure cycle parking at train stations</li> </ul>	<p><i>2021 data from corresponding 2021 survey questions for all available cities.</i></p>
<p>Length of traffic-free cycle paths away from the road</p>	<p>Traffic free cycle routes are away from roads that pass-through parks, alongside canals, on former railway lines or similar. Traffic free paths should be waterproof surfaces that cycles are legally permitted on.</p> <p>Data supplied by partner authorities. Data was not provided for Cork, Galway, Limerick Shannon and Waterford Metropolitan Areas.</p> <p><i>2021 data for those who supplied data for the Index 2021,</i></p>
<p>Length of cycle paths physically separated from traffic and pedestrians</p>	<p>Cycle routes on the carriageway that are physically separated from traffic and pedestrians by a kerb or something similar. This includes Orca Rediweld and flexible delineator posts.</p> <p>Data supplied by partner authorities. Data was not provided for Cork, Galway, Limerick Shannon and Waterford Metropolitan Areas.</p>

Data item	Sources and notes
<p>Length of signposted cycle routes on quieter streets</p>	<p><i>2021 data for those who supplied data for the Index 2021,</i></p> <p>Signposted cycle routes on quieter streets connect main arterial and orbital routes with traffic free sections. These routes should be on local roads, have good signage i.e. easy for someone unfamiliar with the route to navigate, have low traffic i.e. less than 2,500 vehicles each day, be low speed with 20mph/30km/h speed limits.</p> <p>Data supplied by partner authorities.</p> <p>This was an optional cycle routes category.</p> <ul style="list-style-type: none"> <li>• The following cities supplied data: Cardiff, Dublin Metropolitan Area, Edinburgh, Glasgow, Greater Manchester, Liverpool City Region, Perth, Stirling, Tower Hamlets and Tyneside (Data for Newcastle and Gateshead only). Perth currently has no signed cycle routes on low-trafficked and low speed roads.</li> <li>• The following cities did not supply data: Aberdeen, Belfast, Birmingham, Bristol, Cork Metropolitan Area, Dundee, Dunfermline, Galway Metropolitan Area, Greater Cambridge, Inverness, Limerick Shannon Metropolitan Area, Southampton City Region and Waterford Metropolitan Area.</li> </ul> <p><i>2021 data for those who supplied data for the Index 2021.</i></p>
<p>Dublin Metropolitan Area only: Length of cycle tracks level with the footpath distinguished by a different surface</p>	<p>This category is unique to Dublin Metropolitan Area. Data was supplied by the partner authority.</p> <p><i>The 2021 data was revised downwards in 2023 following a comprehensive re-mapping exercise by the National Transport Authority. This figure is believed to be more accurate to</i></p>

Data item	Sources and notes
	<i>the route network.</i>
Percentage of households within 125m of these routes	<p>Calculated by Sustrans based on data provided by partner authorities for each city. The distance of 125m was taken from the Welsh Active Travel Act, where cycling networks should be designed to have a mesh width of 250m in central areas (<a href="#">Active Travel Act guidance (gov.wales)</a>).</p> <p>For Cardiff, Dublin Metropolitan Area, Edinburgh, Glasgow, Greater Manchester, Liverpool City Region, Perth, Stirling, Tower Hamlets and Tyneside this figure is based on the following routes:</p> <ul style="list-style-type: none"> <li>• cycle tracks physically separated from traffic and pedestrians</li> <li>• traffic free cycle routes away from the road</li> <li>• signposted cycle routes along quieter streets</li> </ul> <p>For Aberdeen, Belfast, Birmingham, Bristol, Dundee, Greater Cambridge, Inverness, and Southampton City Region the optional ‘signposted cycle routes along quieter streets category’ was not provided so this figure is based on the following routes:</p> <ul style="list-style-type: none"> <li>• cycle tracks physically separated from traffic and pedestrians</li> <li>• traffic free cycle routes away from the road</li> </ul> <p>For Dunfermline, this figure is based on traffic free cycle routes only, as they currently do not have any cycle tracks physically separated from traffic and pedestrians.</p> <p>For Cork, Galway, Limerick Shannon and Waterford Metropolitan Areas it was not possible to calculate these values, as route length data was not provided by partner authorities.</p>

Data item	Sources and notes
	<p>For each city, this was calculated using the route types above and postcode data (from March 2023). For household data sources and licences, see explanations for <a href="#">page 14</a> of the Index report under Percentage of households located in neighbourhoods of walkable density (40 homes per hectare).</p>
<p>Number of cycle parking spaces at - railway and bus stations</p>	<p>Number of publicly accessible and free to use cycle parking spaces at railway and bus stations presented alongside the total number of stations.</p> <p>Data supplied by partner authorities. Some cities also included other public transport stations which have been included in the figures for Railway stations:</p> <ul style="list-style-type: none"> <li>• Birmingham and Tyneside includes cycle parking at Metro stations</li> <li>• Dublin Metropolitan Area and Greater Manchester includes cycle parking at tram stops</li> <li>• Glasgow includes subway station cycle parking</li> <li>• Liverpool City Region includes cycle parking at ferry stations</li> <li>• Tower Hamlets include cycle parking at Underground and Docklands Light Railway (DLR) stations</li> </ul> <p>Data was not provided for Cork, Galway, Limerick Shannon and Waterford Metropolitan Areas.</p> <p><i>2021 data for railway cycle parking only except Tyneside, Dublin Metropolitan Area, Glasgow, Liverpool City Region and Tower Hamlets who also included parking at Metro stations, tram stops, subway stations, ferry stations and Underground/ DRL stations respectively. All data supplied by partner authorities for the Index 2021. Greater Manchester did not provide data for cycle parking at stations in 2021.</i></p>

Data item	Sources and notes
Percentage of residents who support building more cycle paths physically separated from traffic and pedestrians, even when this would mean less room for other road traffic	<p>The percentage of respondents answering ‘strongly support’ or ‘tend to support’ to Q18 in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey question (Q18) for all available cities.</i></p>

## Residents want more support to cycle (page 17)

Data item	Sources and notes
<p>Percentage of residents that would find the following support useful to cycle more:</p> <ul style="list-style-type: none"> <li>• cycling training courses and organised social rides</li> <li>• access or improvements to a city cycle sharing scheme,</li> <li>• access to secure cycle storage at or near home</li> <li>• access to a bicycle</li> <li>• access to an electric cycle,</li> <li>• access to a cargo cycle with space to carry children or shopping</li> <li>• access to an adapted cycle like tricycle or recumbent cycle</li> </ul>	<p>The percentage of respondents answering ‘very useful’ or ‘fairly useful’ to Q12f, Q12d, Q12l, Q12h, Q12i, Q12k, Q12j in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey questions for all available cities.</i></p>

Data item	Sources and notes
<p>Cycle hire scheme data:</p> <ul style="list-style-type: none"> <li>• Hire cycles</li> <li>• Cycle hire stations</li> <li>• Annual trips</li> </ul>	<p>Data is for July 2022-June 2023 unless otherwise stated. Cycle hire scheme data was obtained from the relevant scheme operators by partner authorities and is reported only for the following cities:</p> <ul style="list-style-type: none"> <li>• Aberdeen: Big Issue Ebikes, Data for November 2022 -June 2023</li> <li>• Belfast: NSL Belfast Bikes</li> <li>• Birmingham: Beryl Bikes</li> <li>• Cardiff: NextBike by Tier</li> <li>• Cork Metropolitan Area: TFI Bikes</li> <li>• Dublin Metropolitan Area: Moby, Tier (Fingal), BleeperBikes, Zipp, Dublin Bikes and ESB Bikes. data provided by the operators. All schemes are dockless apart from Dublin Bikes and EBS, so these do not have any cycle share stations.</li> <li>• Galway Metropolitan Area: TFI Bikes</li> <li>• Glasgow: Ovo Bikes</li> <li>• Greater Cambridge: Voi. Data for the ebike scheme only</li> <li>• Greater Manchester: Beryl Bikes</li> <li>• Inverness: Hi-Bike</li> <li>• Limerick Metropolitan Area: TFI Bikes and CoMotion</li> <li>• Southampton City Region: Beryl Bikes. Data for October 2022-June 2023</li> <li>• Stirling: Tier (formally NextBike). The Scheme has been pared back since 2021 and now mainly supports Stirling University Students</li> <li>• Tower Hamlets: Santander Cycles. data provided by the partner authority from Transport for London.</li> <li>• Waterford Metropolitan Area: TFI Bikes</li> </ul> <p>There are currently no permanent cycle share schemes in operation in Bristol, Dundee,</p>

Data item	Sources and notes
	<p>Dunfermline, Edinburgh, Liverpool City Region, Perth and Tyneside.</p> <p><i>2021 data supplied by relevant partner authorities or CoMoUK for the Index 2021. All data for July 2020-June 2021, unless otherwise stated.</i></p>
Number of reported cycle thefts	<p>Reported cycle theft figures were provided by partner authorities following Sustrans' guidance, and were usually obtained from local councils, police forces, Police UK website or from FOI requests for Scottish cities. The data in the reports is shown for the 2022-23 and 2021-22 financial years.</p>
Number of people who own an adult cycle in the city, for every 1 reported cycle theft in the past year	<p>The number of people who own an adult cycle is calculated by multiplying the total adult population (16+) of the city by the percentage of adults in the city who own one or more adult cycle (from Q22a, Q22b, Q22c and Q22d in the independent survey of residents). This is then divided by the total number of reported cycle thefts in 2022/23 (see above).</p>
Number of people who cycle per public parking space	<p>The percentage of residents who 'ever' cycle (respondents choosing any frequency other than 'never' for Q2e in the independent survey of residents.) scaled up for the whole adult population of the city (16+) and then divided by the total number of public cycle parking spaces in the city (data provided by the partner authority). This is cycle parking spaces, not stands; one Sheffield stand is two cycle parking spaces.</p> <p>Includes all public cycle parking available to the general public. Excludes parking at workplaces, educational establishments, and public transport stations (rail, bus and tram/ metro/ ferry stations) that are for exclusive or preferential use by people at those establishments.</p> <p><i>2021 data used the corresponding 2021 survey question, 2021 number of public cycle parking spaces provided by partner authorities and the latest available population statistic.</i></p>



Data item	Sources and notes
Proportion of residents that have access to an adult cycle	<p>The percentage of respondents answering that they owned at least one of the following types of adult cycles, in the independent survey of residents and the percentage of respondents from socio-economic demographic subgroups AB and DE.</p> <ul style="list-style-type: none"> <li>• Adult pedal bicycle (non-electric) (Q22a)</li> <li>• Adult electric bicycle (Q22b)</li> <li>• Other adult cycles (including hand-cycles, tricycles, tandems, recumbents) (Q22c)</li> <li>• Cargo cycles (with space to carry children or shopping) (Q22d)</li> </ul> <p><i>2021 data used the corresponding 2021 survey questions for all available cities.</i></p>
Percentage of residents who support financial discounts for people on low incomes or not in employment to help them buy a cycle	<p>The percentage of respondents answering 'strongly support' or 'tend to support' to Q15c_d in the independent survey of residents.</p>
Percentage of households within 800m from a cycle shop	<p>800m concentric rings calculated for all cycle shops within each city boundary. Households within these rings were then identified and percentage calculated.</p> <p><b>Cycle shops:</b>  UK cities: Cycle Shop data is sourced from USMART under Open Government Licence v.3.0   Credit to the Association of Cycle Traders (ACT) for their assistance with cycle shop locations and services offered.</p> <p>Republic of Ireland: OSM Overpass query where key = shop and value = <a href="#">bicycle</a>. © OpenStreetMap contributors.</p>
Story from a city resident	<p>Case studies from local city residents were sourced from local contacts.</p>

## Pages 18 and 19: Neighbourhood solutions

### All residents should feel welcome in their neighbourhood (page 18)

Data item	Sources and notes
<p>Percentage of residents who feel welcome and comfortable walking, wheeling or spending time on the streets of their neighbourhood</p>	<p>The percentage of respondents answering 'strongly agree' or 'tend to agree' to Q16a in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey question for all available cities.</i></p>
<p>Proportion of residents who feel welcome and comfortable walking, wheeling or spending time on the streets of their neighbourhood within different demographic subgroups:</p> <ul style="list-style-type: none"> <li>• gender and sexuality,</li> <li>• ethnicity,</li> <li>• disability</li> <li>• socio-economic group</li> </ul>	<p>The percentage of respondents of these gender and sexuality, ethnicity, disability, and socio-economic demographic subgroups (Q25a, Q25b and Q26, Q28, Q23, Q34 and Q27) answering 'strongly agree' or 'tend to agree' to Q16a in the independent survey of residents.</p> <p>Republic of Ireland: the report contains data on gender, but not sexuality, as Q25b (Do you identify as trans?) was not included in the questionnaire. Therefore, the LGBTQ+ subgroup results could not be calculated.</p> <p><i>2021 data from the corresponding 2021 survey questions for all available cities. No 2021 comparison given for LGBTQ+ because only LGBQ+ (not Trans) was measured in 2021.</i></p>

## The dominance of motor vehicles can discourage walking, wheeling, and cycling (page 18)

Data item	Sources and notes
Percentage of residents that think that their streets are not dominated by moving or parked motor vehicles	<p>The percentage of respondents answering ‘strongly agree’ or ‘tend to agree’ to Q16g in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey question for all available cities.</i></p>
Percentage of residents who would find fewer motor vehicles on their streets useful to: <ul style="list-style-type: none"> <li>• walk or wheel more,</li> <li>• cycle more</li> </ul>	<p>The percentage of respondents answering ‘very useful’ or ‘fairly useful’ to Q11d and Q12g in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey questions for all available cities.</i></p>
Percentage of unclassified road length in the city that are not designed to carry through traffic	<p>Based on data supplied to Sustrans by the creators of CycleStreets’ <a href="http://www.lowtrafficneighbourhoods.org">www.lowtrafficneighbourhoods.org</a>.</p> <p>Road classifications follow those used by Open Street Map <a href="#">Highway: International equivalence - OpenStreetMap Wiki</a></p> <p>For the UK, “unclassified roads” are all public roads that are neither motorways, A, B nor C roads. This is the sixth category on Open Street Map. For Ireland the equivalent sixth category is “less significant minor roads”.</p> <p>For each city, CycleStreets has sub-divided these lesser roads into ones that are either:</p> <ol style="list-style-type: none"> <li>a) Through-streets</li> <li>b) Through-streets with traffic calming</li> <li>c) No-through streets</li> </ol>

Data item	Sources and notes
	<p>The percentage is obtained by dividing (a) by (a)+(b)+(c)            More major roads (the first to fifth categories on Open Street Map) are excluded from the calculation because they are usually necessary for traffic distribution, and it is less likely that these could ever be suitable for conversion to access-only status.</p>
<p>Percentage of residents who agree that restricting through traffic on local residential streets would make their area a better place</p>	<p>The percentage of respondents answering ‘strongly agree’ or ‘tend to agree’ to Q17b in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey question for all available cities.</i></p>
<p>UK cities: Percentage of streets in the city that are 20mph</p> <p>Dublin Metropolitan Area: Percentage of streets that should typically have traffic travelling at speeds below 30km/h</p>	<p>This is the percentage of the total street length to which a 20mph limit applies, not the percentage of named streets that are 20mph. Excludes motorways, special roads and unadopted streets as these will never be appropriate for 20mph limits or there is no control over the speed limits on these streets.</p> <p>Edinburgh also excludes trunk roads from their calculations.</p> <p>Data supplied by partner authorities.</p> <p>Dublin Metropolitan Area reports on the percentage of all streets that should have traffic travelling at speeds below 30km/h, as data is NAVTEQ NAVSTREETS Speed Category data, rather than actual records of legally posted 30km/h signs.</p> <p><i>2021 data supplied by relevant partner authorities for the Index 2021. Due to differences in GIS operating platforms between different data sources there may be slight discrepancies on total network lengths between 2021 and 2023 for Tower Hamlets.</i></p>
<p>Percentage of residents who would</p>	<p>The percentage of respondents answering ‘very useful’ or ‘fairly useful’ to Q11e and Q12e</p>

Data item	Sources and notes
find more streets with 20mph (30km/h for the Republic of Ireland cities) speed limits useful to: <ul style="list-style-type: none"> <li>walk or wheel more,</li> <li>cycle more</li> </ul>	in the independent survey of residents.  <i>2021 from corresponding 2021 survey questions for all available cities.</i>

## Residents want local streets to be better spaces for people to spend time in (page 18)

Data item	Sources and notes
Percentage of residents who agree increasing space for people socialising, walking, wheeling and cycling on their local high street (main street for the Republic of Ireland cities) would improve their local area	The percentage of respondents answering 'strongly agree' or 'tend to agree' to Q17d in the independent survey of residents.  <i>2021 data from corresponding 2021 survey question for all available cities.</i>
Percentage of residents who agree they regularly chat to their neighbours, more than just to say hello	The percentage of respondents answering 'strongly agree' or 'tend to agree' to Q16d in the independent survey of residents.  <i>2021 data from corresponding 2021 survey question for all available cities.</i>
Percentage of residents who support low traffic neighbourhoods	The percentage of respondents answering 'strongly support' or 'tend to support' to Q19 in the independent survey of residents.

Data item	Sources and notes
	<i>2021 data from corresponding 2021 survey question for all available cities.</i>

## Neighbourhoods must be designed with children in mind (page 19)

Data item	Sources and notes
Story from a city resident	Case studies from local city residents were sourced from local contacts.
Average age when people in city who have children in their household would let them walk, wheel or cycle independently in their neighbourhood	Median age given by respondents living with children in their household by answering to Q31 in the independent survey of residents.  <i>2021 data from corresponding 2021 survey question for all available cities.</i>
Context data for average age of independent travel of children in Germany	Source: Children's Independent Mobility: an international comparison and recommendations for action, 2015.
Percentage of residents who agree there is space for children to socialise and play	The percentage of respondents answering 'strongly agree' or 'tend to agree' to Q16e in the independent survey of residents.  <i>2021 data from corresponding 2021 survey question for all available cities.</i>
Percentage of households within 400m of a children's playground (800m for the Republic of Ireland and Belfast)	400m concentric rings (800m for the Republic of Ireland and Belfast) calculated for each OS Greenspace 'Play Space' Access Point (GB cities) or Open Street Map 'playground' in each city. Households within these rings were then identified and percentage calculated.  <b>Children's playgrounds:</b> GB cities: <a href="#">Ordnance Survey Open Greenspace</a> access points with 'Play Space'

Data item	Sources and notes
	<p>classification and accessType = pedestrian.            Belfast and Dublin Metropolitan Area: OSM Overpass query where key = leisure and value = <a href="#">playground</a>. © OpenStreetMap contributors.</p> <p>For household data sources and licences, see explanations for Percentage of households located in neighbourhoods of walkable density (40 homes per hectare) <a href="#">page 14</a> of the Index report.</p>
<p>Percentage of residents who agree and disagree that closing streets outside local schools to cars during drop-off and pick-up times would improve their local area</p>	<p>The percentage of respondents answering ‘strongly agree’ or ‘tend to agree’ and ‘tend to disagree’ or ‘strongly disagree’ to Q17a in the independent survey of residents.</p> <p><i>2021 data from corresponding 2021 survey question for all available cities.</i></p>
<p>Number of schools with School Streets schemes in the city</p>	<p>Number of schools with permanent School Streets schemes. This is where roads are closed to cars during school drop off and pick up times. Each scheme can benefit more than one school; therefore, the data is presented as the number of schools benefitting from a School Street scheme not the number of schemes in operation in the city. Cardiff, Dundee, Glasgow, and Greater Manchester have some schemes that cover more than one school.</p> <p>In Tower Hamlets this includes one school where the road outside the school has a permanent road closure rather than a time limited closure. This is a result of the street becoming pedestrianised.</p> <p>Excludes trial schemes because these are not permanent. Cities that mentioned/ reported that they have additional trial schemes include, but not limited, to Birmingham, Cardiff,</p>

Data item	Sources and notes
	<p data-bbox="752 336 2042 408">Edinburgh, Glasgow, Greater Manchester, Liverpool City Region, Perth, Southampton City Region, Tower Hamlets and Tyneside.</p> <p data-bbox="752 448 1301 483">Data provided by the partner authority.</p> <p data-bbox="752 523 1951 595"><i>2021 data supplied by relevant partner authorities for the Index 2021. Belfast did not supply data in 2021.</i></p>



## Pages 20 and 21: Developing [city]

### Recent walking, wheeling, cycling and neighbourhood changes

Data item	Sources and notes
Information on projects, schemes and investments across the city.	Information provided by the partner authority.

## Pages 22 and 23: Looking forward

### Better streets and places for everyone

Data item	Sources and notes
Information on future plans for walking, wheeling and cycle schemes and investments across the city.	Information provided by the partner authority.
Story from a city resident	Case studies from local city residents were sourced from local contacts.

# Appendices

## Appendix A: Participating cities

Table 1 Cities, boroughs and metropolitan areas in the UK and Ireland involved in the Walking and Cycling Index

City	2015	2017	2018	2019	2021	2023
Aberdeen	-	-	-	-	Yes	Yes
Belfast	Yes	Yes	-	Yes	Yes	Yes
Birmingham	Yes	Yes	-	As West Midlands	As West Midlands	Yes
Bristol	Yes	Yes	-	Yes	Yes	Yes
Cardiff	Yes	Yes	-	Yes	Yes	Yes
Cork Metropolitan Area	-	-	-	-	-	Yes
Dublin Metropolitan Area	-	-	-	Yes	Yes	Yes

City	2015	2017	2018	2019	2021	2023
Dundee	-	-	-	Yes	Yes	Yes
Dunfermline	-	-	-	-	-	Yes
Edinburgh	Yes	Yes	-	Yes	Yes	Yes
Galway Metropolitan Area	-	-	-	-	-	Yes
Glasgow	-	-	Yes	-	Yes	Yes
Greater Cambridge	-	-	-	Yes	Yes	Yes
Greater Manchester	Yes	Yes	-	Yes	Yes	Yes
Inverness	-	-	-	Yes	Yes	Yes
Limerick Shannon Metropolitan Area	-	-	-	-	-	Yes
Liverpool City Region	-	-	-	Yes	Yes	Yes
Perth	-	-	Yes	-	Yes	Yes
Southampton City Region	-	-	-	Yes	Yes	Yes
Stirling	-	-	Yes	-	Yes	Yes

City	2015	2017	2018	2019	2021	2023
Tower Hamlets	-	-	-	Yes	Yes	Yes
Tyneside	As Newcastle	As Newcastle	-	Yes	Yes	Yes
Waterford Metropolitan Area	-	-	-	-	-	Yes

## Appendix B: Independent resident survey - methodology

An independent representative survey of residents was conducted in each participating city (for list of cities see [Appendix A](#)). For UK cities this was conducted by NatCen Social Research, while Behaviour & Attitudes (B&A) conducted the Republic of Ireland survey.

The survey by NatCen Social Research aimed to gather a representative sample of at least 1,100 respondents aged 16 and above in each of the 18 UK cities (the actual number of completed surveys is between 1,071 and 1,338 for all cities). The sample of respondents was stratified first by the Index of Multiple Deprivation quintiles<sup>8</sup> and then by Output Area classifications<sup>9</sup> to reflect the profile of each city. The NatCen survey was a 'push to online', where letters including access codes and login credentials for the online survey were posted to specific addresses of the sample chosen by the stratification described above. There was also a paper format of the questionnaire that could be returned by prepaid postage. The data collection took place from 31<sup>st</sup> March to 2<sup>nd</sup> July, and included any paper versions which arrived by 28<sup>th</sup> July 2023.

The 2021 residential survey in 17 UK cities was conducted between 2<sup>nd</sup> June and 23<sup>rd</sup> August 2021 (slightly later than 2023 due to the COVID-19 pandemic) by the same research agency, following the same sampling process and using the same methodology, with similar questionnaire. For more information see the [2021 methodology paper](#).

Behaviour & Attitudes (B&A) aimed to gather a representative sample of at least 1,100 respondents aged 16 and above in each of the five Metropolitan Areas in the Republic of Ireland

---

8 The Index of Multiple Deprivation is an official statistic produced by the UK Government.

9 Output Areas are the lowest geographical level at which Census and mid-year estimates are provided.

(the actual number of completed surveys is between 1,099 and 1,105 for all cities). There were enough interviews with cyclists for all cities except Limerick Shannon Metropolitan Area, where an additional 18 interviews with cyclists were needed. The sample was stratified by population areas and then electoral divisions, following which quotas were applied for age, gender and socio-economic status. The B&A survey was conducted face-to-face. The content of the survey was almost identical to the UK survey but was updated to be more relevant for Ireland eg using kilometres rather than miles and adjusting interview instructions and question wording to be more suited for the face-to-face interview format. The fieldwork was carried out from 25<sup>th</sup> April to 25<sup>th</sup> July 2023.

The 2021 residential survey in Dublin Metropolitan Area was conducted between 3<sup>rd</sup> June and 11<sup>th</sup> July 2021 by the same research agency, following the same sampling process and using same methodology, with similar questionnaire. This was a face-to-face survey, but with extra Covid-19 measures implemented to ensure safety of both participants and interviewers.

### **Weighting:**

For UK cities, survey data was weighted to adjust for differences in probability of selection within city<sup>10</sup>, differences in address/household response rates, and differences in individual response rates, to match the population estimates for age, sex and the number of ethnic minority residents by city<sup>11</sup>.

---

<sup>10</sup> Tower Hamlets was the only city with differential selection probability, because the boost sample targeted areas with higher proportions of ethnic minority residents. As a result, areas included in the boost had a higher selection probability than areas not included in the boost.

<sup>11</sup> 2021 mid-year population estimates from the Office for National Statistics (ONS) and National Records of Scotland (NRS) were used to estimate age/sex. Ethnicity estimates are from Census 2021 for England, Wales and Northern Ireland, Census 2011 for Scotland. The Tower Hamlets was calibrated to more detailed Census 2021 estimates of ethnicity in the borough. The ethnicity categories used for Tower Hamlets calibration were: Asian, Black, mixed and other, and white.

For the Republic of Ireland cities, a two-step weighting process was applied. At the first step, weighting was applied by age and ethnicity<sup>12</sup>. All weighting proportions were based on the National Census 2016. For the second step, a corrective weight was applied to the regional areas.

---

<sup>12</sup> Due to Quota sample, data were not weighted by gender.



# Appendix C: Survey questionnaire

## Travel Survey

Please note:

We use the term 'wheeling' throughout the questionnaire. We recognise some people may not identify with the term walking and prefer wheeling, for example those who use a wheelchair or mobility scooter.

We use the term electric scooter (e-scooter) in this questionnaire. An electric scooter (e-scooter) is a 2-wheeled scooter, designed to carry one person in a standing position, which is fitted with an electric motor.

**Firstly, we would like to ask some questions about how you travel around.**

{ASK ALL} **Q1.** How many cars or vans are owned, or are available for use in your household?

None

One

Two

Three or more

{ASK ALL} **Q2.** Thinking about the different ways in which you travel around, how often do you...? Please give your best guess.

- a) Travel by car, van or motorcycle as a driver
- b) Travel by car, van or motorcycle as a passenger
- c) Walk or wheel
- d) Run
- e) Cycle
- f) Use public transport
- g) Use an electric scooter (e-scooter)

7 days a week  
5-6 days a week  
2-4 days a week  
Once a week  
Once a fortnight  
Once a month  
Less often  
Never

{ASK ALL CODED 1-7 AT Q2a} **Q3.** In the last 7 days, how many one-way journeys did you make by car up to **3 miles in length**? (If you travelled to a place and back, please count that as two trips). This question is referring to your behaviour as a DRIVER of a CAR, and it should not include your behaviour as a PASSENGER.

15+ times  
13-14 times  
11-12 times  
9-10 times  
7-8 times  
5-6 times  
3-4 times  
1-2 times  
None

**The following questions are about walking and wheeling.**

{ASK IF CODES 1-7 AT Q2c} **Q4a.** Please give your **best estimate** of how many **one-way trips** you walked or wheeled in the last 7 days from home **to a destination** like work, school, shopping, the gym, the bus stop, or to visit friends/family. Do not count simple walks with no particular destination. If you walk / wheel to a place and back, please count that as two trips.

15+ times  
13-14 times  
11-12 times  
9-10 times

7-8 times

5-6 times

3-4 times

1-2 times

None

I only ever walk / wheel for leisure, or not at all

{ASK IF CODES 1-8 AT Q4a} **Q4b.** Thinking about your most frequent **one-way walk or wheel to a destination**, please give your **best estimate** of how far this is (**in metres**, e.g. 250 metres, 1,000 metres).

NUMERICAL RESPONSE IN METRES. RANGE 100-10,000 metres

{ASK IF DISTANCE GIVEN AT Q4b} **Q4c.** Still thinking about your most frequent one-way walk or wheel to a destination, please give your **best estimate** of how long this takes (in minutes).

NUMERICAL RESPONSE IN MINUTES. RANGE 1-180 minutes

{ASK IF CODES 1 TO 7 AT Q2c OR Q2d} **Q5a.** Please give your best estimate of how many **walks, wheels or runs** you took in the last 7 days for **enjoyment or fitness** (just for pleasure or to keep fit, including running or walking a dog)?

15+ times

13-14 times

11-12 times

9-10 times

7-8 times

5-6 times

3-4 times

1-2 times

None

I never walk / wheel or run for recreation or enjoyment

{ASK IF CODES 1-8 AT Q5a} **Q5b.** Thinking about your most frequent **walk, wheel or run for enjoyment or fitness**, please give your **best estimate** of how far this is (**in metres**, e.g. 500 metres, 4,000 metres).

NUMERICAL RESPONSE IN METRES. RANGE 100-20,000 metres

{ASK IF DISTANCE GIVEN AT Q5b}. **Q5c.** Still thinking about your most frequent walk, wheel or run for enjoyment or fitness, please give your **best estimate** of how long this takes (**in minutes**).

NUMERICAL RESPONSE IN MINUTES. RANGE 1-500 minutes

**The following questions are about cycling.**

{ASK IF CODES 1 TO 7 AT Q2e} **Q6a.** How often do you cycle to and from **work**?

7 days a week

5-6 days a week

2-4 days a week

Once a week

Once a fortnight

Once a month

Less often

Never

I do not work, or I work from home all of the time

{ASK IF CODES 1-7 AT Q6a} **Q6b.** Please give your **best estimate** of the typical distance **in miles** of a **one-way cycle trip to or from work** (e.g. 3 miles, 1.5 miles).

NUMERICAL RESPONSE IN MILES. RANGE 0.25-50.00 miles

{ASK IF CODES 1-7 AT Q6a} **Q6c.** Please give your **best estimate** of the typical duration **in minutes** of a one-way cycle trip to or from work.

NUMERICAL RESPONSE IN MINUTES. RANGE 1..150  
minutes

{ASK IF CODES 1 TO 7 AT Q2e} **Q7a.** How often do you cycle to get around **as part of your job**? For example, for delivering items or travelling to meetings?

7 days a week

5-6 days a week

2-4 days a week

Once a week

Once a fortnight

Once a month

Less often

Never

I do not work or travelling is not part of my job

{ASK IF CODES 1-7 AT Q7a} **Q7b.** Please give your **best estimate** of the typical distance **in miles** of a **one-way cycle trip to get around as part of your job** (e.g. 3 miles, 1.5 miles).

NUMERICAL RESPONSE IN MILES. RANGE 0.25-50.00 miles

{ASK IF CODES 1-7 AT Q7a} **Q7c.** Please give your **best estimate** of the typical duration **in minutes** of a one-way cycle trip to get around as part of your job.

NUMERICAL RESPONSE IN MINUTES. RANGE 1..150  
minutes

{ASK IF CODES 1 TO 7 AT Q2e} **Q8a.** During school term (not holidays), how often do you cycle to or from **school, college or**

**university?** This includes accompanying a child or someone else.

7 days a week

5-6 days a week

2-4 days a week

Once a week

Once a fortnight

Once a month

Less often

Never

I do not go to school, college or university, or accompany anyone else to them

{ASK IF CODES 1 TO 7 AT Q8a} **Q8b.** Please give your **best estimate** of the typical distance **in miles** of a **one-way cycle trip to or from school, college or university** (e.g. 3 miles, 1.5 miles).

NUMERICAL RESPONSE IN MILES. RANGE 0.25-50.00 miles

{ASK IF CODES 1 TO 7 AT Q8a} **Q8c.** Please give your **best estimate** of the typical duration **in minutes** of a one-way cycle trip to or from school, college or university.

NUMERICAL RESPONSE IN MINUTES. RANGE 1-150 minutes

{ASK IF CODES 1 TO 7 AT Q2e} **Q9a.** How often do you **cycle for shopping, personal business or social trips?** e.g. to travel from your home to the supermarket, doctors, or to visit friends or family.

7 days a week

5-6 days a week

2-4 days a week

Once a week

Once a fortnight

Once a month

Less often

Never

I do not make any shopping, personal business or social trips

{ASK IF CODES 1 TO 7 AT Q9a} **Q9b.** Please give your **best estimate** of the typical distance **in miles** of a **one-way cycle trip for shopping, personal business or social trips** (e.g. 3 miles, 1.5 miles).

NUMERICAL RESPONSE IN MILES. RANGE 0.25-50.00 miles

{ASK IF CODES 1 TO 7 AT Q9a} **Q9c.** Please give your **best estimate** of the typical duration **in minutes** of a one-way cycle trip for shopping, personal business or social trips.

NUMERICAL RESPONSE IN MINUTES. RANGE 1-150 minutes

{ASK IF CODES 1 TO 7 AT Q2e} **Q10a.** How often do you **cycle just for enjoyment or fitness?**

7 days a week

5-6 days a week

2-4 days a week

Once a week

Once a fortnight

Once a month

Less often

Never

I do not go out for fitness / enjoyment

{ASK IF CODES 1 TO 7 AT Q10a} **Q10b.** Please give your **best estimate** of the typical distance **in miles** of your **round trip cycle ride for enjoyment or fitness** (e.g. 3 miles, 1.5 miles).

NUMERICAL RESPONSE IN MILES. RANGE 0.25-150.00 miles

{ASK IF CODES 1 TO 7 AT Q10a} **Q10c.** Please give your **best estimate** of the typical duration **in minutes** of your round trip cycle ride for enjoyment or fitness.

NUMERICAL RESPONSE IN MINUTES. RANGE 1-500 minutes

**And now some questions about why you walk, wheel and cycle or not.**

{ASK ALL} **Q11.** How useful would each of the following be to help you walk or wheel more?

- a) More shops and everyday services, such as banks and post offices, close to your home
- b) More government services, such as doctors surgeries and schools, close to your home
- c) Less fear of crime or antisocial behaviour in your area
- d) Fewer motor vehicles on our streets
- e) More streets with 20mph speed limits
- f) Fewer cars parked on the pavement
- g) Better pavement accessibility, e.g. level surfaces, dropped kerbs at crossing points, fewer obstructions
- h) Wider pavements
- i) More frequent road crossings, with reduced wait times
- j) Nicer places along streets to stop and rest, e.g. more benches, trees and shelter
- k) More things to see and do close to your home, e.g. cafés or entertainment venues
- l) More parks or green spaces close to your home

Very useful

Fairly useful

Not very useful

Not useful at all



{ASK ALL} **Q12.** How useful, if at all, would any of the following be to help you start cycling or to cycle more?

- a) More cycle paths along roads which are physically separated from traffic and pedestrians
- b) More traffic-free cycle paths away from roads, e.g. through parks or along waterways
- c) More signposted local cycle routes along quieter streets where there is less traffic
- d) Access or improvements to a city cycle sharing scheme
- e) More streets with 20mph speed limits
- f) Cycling training courses and organised social rides
- g) Fewer motor vehicles on our streets
- h) Access to a bicycle
- i) Access to an electric cycle
- j) Access to an adapted cycle, e.g. a tricycle or handcycle
- k) Access to a cargo cycle with space to carry children or shopping
- l) Access to secure cycle storage at or near home
- m) Better links with public transport, e.g. secure cycle parking at train stations

Very useful

Fairly useful

Not very useful

Not useful at all

{ASK ALL} **Q13.** Which one of the following statements **best** describes you? Would you say you are someone who...

Does not cycle but would like to

Does not cycle and does not want to

Is new or returning to cycling

Occasionally cycles

Regularly cycles

**And now some questions on your views about transport, walking, wheeling and cycling in your local area.**

{ASK ALL} **Q14.** We would like to ask you what you think about walking, wheeling and cycling in your local area. For each statement, please say whether you think it is good or bad?

- a) Your local area overall as a place to walk or wheel
- b) Your local area overall as a place to cycle
- c) Safety when walking or wheeling
- d) Children's safety when walking or wheeling
- e) Safety when cycling
- f) Children's safety when cycling

Very good

Fairly good

Neither good nor bad

Fairly bad

Very bad

{ASK ALL} **Q15a.** Thinking about how often you do the following, in the future would you like to...?

- a) Walk or wheel
- b) Drive
- c) Cycle
- d) Use public transport
- e) Use an electric scooter (e-scooter)

More than now

About the same as now

Less than now

{ASK ALL} **Q15b.** Over the last year, how often have you...

- a) Walked or wheeled because there were no other transport options available
- b) Walked or wheeled because you chose to
- c) Felt anxious or unsafe while walking or wheeling
- d) Walked, wheeled or cycled more because it's cheaper
- e) Used a car because there were no other transport options available

f) Used a car less because of the cost

Often

Occasionally

Never

Not applicable (i.e. I do not walk or wheel, or I do not use a car)

{ASK ALL} **Q15c.** To what extent do you support or oppose the following

- a) A ban on vehicles parking on the pavement
- b) Creating a pavement fund to better maintain and improve pavements
- c) Setting traffic reduction targets and taking action to help achieve these targets
- d) Giving people not in employment and on low incomes financial discounts to help them buy a cycle
- e) Ban new housing developments in areas where driving is the only practical transport option to visit local services, such as shops and doctors surgeries
- f) Shifting investment from new road building schemes and using it instead to fund walking, wheeling, cycling and public transport

Strongly support

Tend to support

Neither support nor oppose

Tend to oppose

Strongly oppose

**And now some questions about your local area.**

{ASK ALL} **Q16.** For each of the following statements, how much do you agree or disagree with these characteristics of your neighbourhood?

- a) You feel welcome and comfortable walking, wheeling or spending time on the streets of your neighbourhood

- b)** You feel able to participate in making your neighbourhood a better place to live
- c)** You can easily get to many places you need to visit, without having to drive
- d)** You regularly chat to your neighbours, more than just to say hello
- e)** There is space for children to socialise and play
- f)** The air is clean
- g)** The streets are not dominated by moving or parked motor vehicles

Strongly agree

Tend to agree

Neither agree nor disagree

Tend to disagree

Strongly disagree

{ASK ALL} **Q17.** For each statement, how much do you agree or disagree that this could make your local area a better place to live, work or visit?

- a)** Close streets outside local schools to cars during school drop-off and pick-up times
- b)** Restrict through-traffic on local residential streets
- c)** Reduce speed limits on local roads in built-up areas to 20mph
- d)** Increase space for people socialising, walking, wheeling and cycling on your local high street, even if this reduces space for cars
- e)** More measures to reduce crime and antisocial behaviour on the street or in public spaces

Strongly agree

Tend to agree

Neither agree nor disagree

Tend to disagree

Strongly disagree

{ASK ALL} **Q18.** To what extent do you support or oppose the creation of more **cycle paths along roads**? These are physically separated from traffic and pedestrians by kerbs and would mean less room for other road traffic.

- Strongly support
- Tend to support
- Neither support nor oppose
- Tend to oppose
- Strongly oppose

{ASK ALL} **Q19.** To what extent do you support or oppose the creation of more **low-traffic neighbourhoods**? Low traffic neighbourhoods are groups of streets, bordered by main roads, where 'through' motor vehicle traffic is greatly reduced. Residents still have access to all parts by car.

- Strongly support
- Tend to support
- Neither support nor oppose
- Tend to oppose
- Strongly oppose

{ASK ALL} **Q20.** To what extent do you support or oppose the creation of **20-minute neighbourhoods**? These are neighbourhoods where it is easy for people to meet most of their everyday needs in a short, convenient and pleasant 20 minute return walk or wheel. For example, having local shops, schools, green space and public transport options within a 10 minute walk or wheel (or 20 minute round trip) of your home.

- Strongly support
- Tend to support
- Neither support nor oppose
- Tend to oppose
- Strongly oppose

{ASK ALL} **Q21.** Would you like to see more or less government spending on each of the following in your local

area or do you think the level of government spending is about right?

- a) On walking and wheeling
- b) On cycling
- c) On public transport
- d) On driving

More government spending

Less government spending

The level of spending is about right

**We would now like to ask you some questions about yourself to help us understand travel choices, barriers and solutions for different groups of people.**

{ASK ALL} **Q22.** How many of each of the following do you own in your household?

- a) Adult pedal bicycles (non-electric)
- b) Adult electric bicycles
- c) Other adult cycles, including hand-cycles, tricycles, tandems, recumbents (pedal or electric)
- d) Cargo cycles with space to carry children or shopping (pedal or electric)
- e) Children's bicycles, tricycles and other types of cycles (pedal or electric)

None

One

Two

Three or more

{ASK ALL} **Q23.** Please can you tell me your age?

NUMERICAL ENTRY. RANGE 16..120

{ASK ALL REFUSED OR ANSWERED DON'T KNOW IF PROMPTED AT Q23] **Q24.** To which of these age bands do you belong?

- 16-20
- 21-25
- 26-30
- 31-35
- 36-40
- 41-45
- 46-50
- 51-55
- 56-60
- 61-65
- 66-70
- 71-75
- 76+

{ASK ALL} **Q25a.** Which of the following describes how you think of yourself?

- Female
- Male
- In another way

{ASK ALL} **Q25b.** Do you identify as trans? This question is voluntary

- No
- Yes
- Prefer not to say

{ASK ALL} **Q26.** Which of the following best describes your sexual orientation?

- Heterosexual (attracted to people of the opposite sex)
- Gay or Lesbian (attracted to people of the same sex)
- Bisexual (attracted to more than one sex)
- Another sexual orientation – write in your answer, for example, pansexual or asexual\_\_\_\_\_

Prefer not to say

{ASK ALL} {VERSION OF Q27a FOR WEB VERSION ONLY}:

**Q27a.** What is the occupation of the MAIN INCOME EARNER in your household?

*List below*

{VERSION OF Q27a FOR PAPER VERSION ONLY}: **Q27a.**

The next question is about the occupation of the main income earner in your household. Is the main income earner of working age or retired?

Main income earner is of working age

Main income earner is currently retired {ANSWER Q27b}

{IF RETIRED AT Q27a}. **Q27b.** Please indicate which one of the following best describes the PREVIOUS OCCUPATION of the main income earner in your household?

- a) Higher managerial / professional / administrative** (e.g. established doctor, solicitor, board director in a large organisation (200+ employees), top level civil servant / public service employee)
- b) Intermediate managerial / professional / administrative** (e.g. newly qualified (under 3 years) doctor, solicitor, board director in a small organisation, middle manager in a large organisation, principal officer in the civil service / local government, teacher, accountant)
- c) Supervisory or clerical / junior managerial / professional / administrative** (e.g. office worker, student doctor, foreman with 25+ employees, salesperson, policeman, nurse, secretary, self-employed)
- d) Skilled manual worker** (e.g. skilled bricklayer, carpenter, electrician, plumber, painter, bus / ambulance driver, HGV/train driver, AA patrolman, mechanic)
- e) Semi or unskilled manual work** (e.g. manual workers, all apprentices in skilled trades, caretaker, park keeper, non-HGV driver, shop assistant, pub / bar worker, factory worker, receptionist, labourer)



- f) Full time education/student
- g) Unemployed
- h) Looking after home or family
- i) Retired {ONLY ON LIST FOR Q27a IN ONLINE VERSION}.

ASSIGN RESPONDENT TO SEG A, B, C1, C2, D, E.

{ASK ALL} **Q28.** What is your ethnic group?

Choose one option that best describes your ethnic group or background.

White

- English / Welsh / Scottish / Northern Irish / British
- Irish
- Gypsy or Irish Traveller
- Roma
- Any other white background

Mixed

- White and Black Caribbean
- White and Black African
- White and Asian
- Any other mixed / Multiple Ethnic background

Asian or Asian British

- Indian
- Pakistani
- Bangladeshi
- Chinese
- Any other Asian background

Black / African / Caribbean / Black British

- Caribbean
- African
- Any other Black / African / Caribbean background

Other ethnic group

- Arab
- Any other ethnic group (please specify)

{ASK ALL} **Q29.** Which of these applies to your home?

Owned outright (without mortgage)

Owned with a mortgage or loan

Owned with a mortgage or loan through an affordable housing scheme

Rented from the council

Rented from someone else

Rent free

{ASK ALL} **Q30.** Please could you tell us the number of children under 16 in your household?

None

One

Two

Three or more

{ASK IF Q30=1+} **Q31.** At what age would you let children in your household walk, wheel or cycle independently in your local neighbourhood?

Enter age. NUMERICAL ENTRY. RANGE 3..21

{ASK ALL} **Q32.** When travelling with children do you use:

(Select one answer only)

A buggy or pushchair when walking or wheeling?

A child seat or cargo bike when cycling?

Both

None

I do not travel with children

{ASK ALL} **Q33.** Please could you tell me the number of adults aged 16 or over in your household **including yourself?**

One

Two

Three or more

{ASK ALL} **Q34.** Do you have any physical or mental health conditions or illnesses lasting or expected to last for 12 months or more? If you have a physical condition and a mental health condition please select both responses.

Yes, I have a physical condition

Yes, I have a mental health condition

No {EXCLUSIVE ANSWER}

{ASK IF YES AT Q34} **Q35.** In which of the following areas, if any, does your physical or mental health condition affect you? Please select all that apply.

Reduced mobility (including physical / dexterity / stamina impairments)

Learning disability

Deaf or hard of hearing

Blind or partially sighted

Mental health conditions (depression, anxiety, bipolar disorder)

Neurodivergent (including dyspraxia, autism and ADHD)

Long term health conditions or chronic illness (diabetes, high blood pressure, long term pain, chronic fatigue)

Other, not listed above

Prefer not to say {EXCLUSIVE ANSWER}

{ASK IF YES AT Q34} **Q36.** Do you use a mobility aid to get around? Please select all that apply.

Wheelchair

Mobility scooter

A cane or guide dog

A walking stick or frame

An adapted cycle

Other

I do not use a mobility aid {EXCLUSIVE ANSWER}

{ASK ALL} **Q37.** Please use this space for any further comments you would like to make:

WRITE IN:

Thank you for your time today.

Please encourage others aged 16+ in your household to also take part. See the letter you received for further details.

# Appendix D: The Walking and Cycling modelling process

The Walking and Cycling Index uses several models that, in combination, provide estimates of the city-wide level of walking, wheeling, and cycling, and associated economic, health and environmental impacts.

## City walking and cycling models

These models estimate the city-wide level of walking, wheeling and cycling using inputs from the residents survey and other sources such as the city population and the mode share of travel to school. The method for calculating individual figures derived from these models are described in further detail under explanations of data on [pages 10](#) and [12](#) of the Index reports.

## Societal gain model

The societal gain model puts a financial value on walking, cycling, and driving by assigning values to their related costs and benefits. For example, the cost to run a car or the health benefits to the NHS from being physically active cycling.

When it comes to non-survey inputs and values used for Societal gain modelling, they are based on best available evidence in the UK and the Republic of Ireland, including the data taken from the Government's standard Transport Analysis Guidance (TAG). For some cases evidence from across Europe has been used.

This methodology is based upon that used for the Copenhagen Bicycle Account, which has been established for 20 years and was one of the main inspirations for the Walking and Cycling Index (formerly Bike Life) model.

The benefits and costs included in our model are shown in the table below. Internal costs and benefits are those to the individual, while external costs and benefits are to society.

<b>Cost/benefit</b>	<b>Description</b>
Time Cost (travel time, non-work)	The value of time spent travelling. The value of time is from the country's transport appraisal guidance and is divided by the average speed. No time cost is ascribed to leisure trips. Internal only.
Vehicle Operating Costs	The cost of owning and running a car (driving), cycle (cycling) or shoe wear (walking). Excludes initial purchase cost. Internal cost: vehicle tax is considered an external benefit but an internal cost.
Prolonged Life	Longer life expectancy from physical activity. Internal benefit and a small external cost (welfare cost).
Health	Decrease in illness incidence, reduced cost of medical treatments, fewer days of sick leave. Includes both an internal and external benefit.
Congestion	The time loss imposed on <i>other travellers</i> because of simultaneous use of the road network, including travel time, operating cost and fuel cost. External cost.
Infrastructure Maintenance	Resurfacing, overlay and road markings of infrastructure used by cars. Infrastructure maintenance cost for cycling and walking is too low to quantify. External cost.
Local Air Quality	This relates to the health and environmental impacts of atmospheric emissions of pollutants from motorised vehicles (CO <sub>2</sub> , CO, SO <sub>2</sub> , NO <sub>x</sub> , PM <sub>10</sub> , Hydrocarbons, Benzene, 1,3-butadiene). External cost.
Noise	Based on the relationship between average noise levels and property prices. External cost.
Greenhouse Gases	The cost associated with the impact on climate change from vehicle CO <sub>2</sub> output. External cost.
Indirect Taxation	Fuel duty. External cost.
Soil and Water	Pollutants released to soil, water bodies

Cost/benefit	Description
Quality	and groundwater, such as hydrocarbons, non-gaseous exhaust, heavy metal particulates from the wear of mechanical components such as brake pads, as well as salt and gravel used for anti-icing or winter maintenance. External cost.
Well-to-tank Emissions	Emissions (of greenhouse gases and other pollutants) due to fuel production and transport to the consumer. External cost.

The values assigned to each are based on the best available evidence and updated for each iteration of the Index.

Between 2021 and 2023:

- For walking and cycling, all factors (except time cost in the Republic of Ireland<sup>13</sup>) increased due to inflation only. In most cases, this made a difference of a few pence per kilometre. For the time cost for walking (UK), this is 14p/km difference.
- For driving: A higher cost of driving was seen in 2023 than 2021.
  - The following factors increased due to inflation only: congestion, local air quality, noise, greenhouse gases, indirect taxation, soil and water quality, and well-to-tank emissions.
  - In the UK, the average driving speed decreased, because average speeds were higher during the Covid-19 lockdowns<sup>14</sup>.
  - In the Republic of Ireland, the value of time decreased after methodological changes in the source.

---

<sup>13</sup> In the Republic of Ireland models, the value of time in the source has decreased following a methodological change, resulting in a lower time cost for all modes.

<sup>14</sup> In the Republic of Ireland, a new method of calculating average speed was used in 2023. This resulted in higher (but more accurate) speeds than in 2021.

- The vehicle operating cost in the UK increased. This was due partially to inflation but mainly due to the lower average mileage value used in 2023<sup>15</sup>.
- The infrastructure maintenance value source changed<sup>16</sup> in the UK and its value went down in both the UK and Republic of Ireland.

Between 2021 and 2023, in most cities we saw a large increase in the difference between the cost of walking and cycling compared to driving. This means the net benefit of journeys walked or cycled when they could have been driven to a destination has risen sharply.

In the UK, the biggest single reason for this was because as congestion increased, driving became slower so the time cost of driving rose, while the costs of walking and cycling only rose in line with inflation.

In the Republic of Ireland, the biggest single reason for this was the decreased value of time, leading to a lower time cost for walking and cycling and offsetting the increased driving speeds.

## **The Health Economic Assessment Tool (HEAT)**

The World Health Organisations Health Economic Assessment Tool<sup>17</sup> (HEAT) provides the value of decreased mortality

---

<sup>15</sup> The source for car operating costs gives an average value per year. We divide this by the most recent available average mileage when the model was updated. In 2021, this was 2019 mileage and in 2023 this was 2021 mileage. Due to the Covid-19 lockdowns, the 2021 mileage was lower than the 2019 mileage, resulting in a higher car operating cost. We acknowledge that this approach has challenges, with changing car use over the pandemic.

<sup>16</sup> The 2021 (all cities) and 2023 Republic of Ireland source is the European Commission's Handbook on External Costs (annex). The latest value is lower than that used in 2021 and close to the value in the 2023 UK source, [TAG](#), where many other values are sourced.

<sup>17</sup> The Health Economic Assessment Tool ([HEAT](#)) for walking and cycling by World Health Organisation



(reduction of the risk of death across the population) that is attributable to the amount of cycling or walking being done by a population, compared to a scenario in which they aren't cycling or walking.

## **MOVES**

MOVES, Sport England's Model for estimating the Outcomes and Values in the Economics of Sport and physical activity<sup>18</sup>, estimates the number of cases of disease avoided by a specified level of physical activity, and the associated savings to the NHS. This is distinct from HEAT, which relates to the monetary value of longer life expectancy attributable to the level of cycling or walking being done in a city.

---

<sup>18</sup> Sport England [MOVES](#) tool